University of Bath

PHD

The investment behaviour of the smaller manufacturing business unit in the Plymouth area 1970-1975 (the Plymouth survey).

Hankinson, Alan

Award date:
1977

Awarding institution:
University of Bath

Link to publication

Alternative formats
If you require this document in an alternative format, please contact:
openaccess@bath.ac.uk

Copyright of this thesis rests with the author. Access is subject to the above licence, if given. If no licence is specified above, original content in this thesis is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC-ND 4.0) Licence (https://creativecommons.org/licenses/by-nc-nd/4.0/). Any third-party copyright material present remains the property of its respective owner(s) and is licensed under its existing terms.

Take down policy
If you consider content within Bath's Research Portal to be in breach of UK law, please contact: openaccess@bath.ac.uk with the details. Your claim will be investigated and, where appropriate, the item will be removed from public view as soon as possible.

Download date: 04. May. 2023

UNIVERSITY OF BATH
LIBRARY
23 FEB 1978
77-81265 4

60 7781265 3 TELEPEN

THE INVESTMENT BEHAVIOUR OF THE SMALLER MANUFACTURING BUSINESS UNIT IN THE PLYMOUTH AREA 1970 TO 1975

(THE PLYMOUTH SURVEY)

submitted by ALAN HANKINSON
for the degree of Ph.D
of the University of Bath

1977

COPYRIGHT

"Attention is drawn to the fact that copyright of this thesis rests with its author. This copy of the thesis has been supplied on condition that anyone who consults it is understood to recognise that its copyright rests with its author and that no quotation from the thesis and no information derived from it may be published without the prior written consent of the author".

"This thesis may be made available for consultation within the University Library and may be photocopied or lent to other libraries for the purposes of consultation".

A Hankinson.

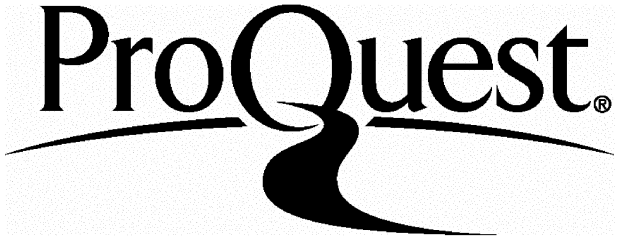
ALAN HANKINSON

ProQuest Number: U641819

All rights reserved

INFORMATION TO ALL USERS
The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript
and there are missing pages, these will be noted. Also, if material had to be removed,
a note will indicate the deletion.



ProQuest U641819

Published by ProQuest LLC(2015). Copyright of the Dissertation is held by the Author.

All rights reserved.
This work is protected against unauthorized copying under Title 17, United States Code.
Microform Edition © ProQuest LLC.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

THE PLYMOUTH SURVEY

A critical SURVEY of the motivations behind investment decision making and an appraisal of investment performance in 65 small manufacturing business units in the Plymouth area between 1970 and 1975.

And a testing of the HYPOTHESIS that "as a consequence of non-strategic investment decision making, levels of capital expenditure and rates of return in the smaller business unit will tend to be sub-optimum, i.e. below that point at which any condition is the most favourable, or below that level of investment and below that rate of return which is reasonably attainable".

ABSTRACT

THE INVESTMENT BEHAVIOUR OF THE SMALLER MANUFACTURING BUSINESS UNIT IN THE PLYMOUTH AREA 1970 TO 1975

(THE PLYMOUTH SURVEY)

This work has been primarily concerned with the testing of the hypothesis that the investment performance of small firms is impaired as a result of capital expenditure being motivated more by reaction to events than by conscious strategy. If small firms were intent upon optimum performance then they would presumably seek to achieve this by sound investment programming. But the results of researching 65 small firms in the wider Plymouth area between 1970 and 1975 indicated that firms chose to ignore, and even avoid, certain opportunities to optimise returns on net assets.

For example, survival or satisfactory profits only, emerged as fundamental goals. Investment strategies were negative or defensive even if apparent, and capital spending was determined in the majority of cases by the "necessity criterion". Firms clearly preferred to use their own funds for investment purposes and external finance was generally avoided despite profit potential. Companies were mainly indifferent to discounted cash flow and although returns on net assets were superior in the firms employing "oper-

ations research" methods, very few respondents were convinced of the benefits of certain management techniques, including D.C.F. Significantly, on an average basis, just over 60% of the sample firms actually failed to reach the target returns on investment which they had set themselves. Hardly any firms had employed consultants and were obviously prejudiced against them despite the absence of actual experience and the fact that rates of return on net assets of the pro-management consultant firms were impressive both in the Plymouth Survey and in the literature. Pricing was based upon rigid criteria, and any flexibility depended upon circumstances rather than policy. Yet flexible pricing did produce superior rates of return. Similarly, outputs were also rigidly determined and levels were rarely manipulated to achieve optimisation of overall performance. Despite an average level of 17% excess capacity, there was negligible market research, market seeking, or advertising, even though sales growth appeared to pay dividends. Finally, there was a significant correlation between returns on net assets and the adoption of a 12 point plan aimed at increasing profitablity. Unfortunately, the 12 point plan was by no means comprehensively employed by the sample firms.

In short, the evidence strongly suggested that the firms' overall investment behaviour was generally inconsistent with the goal of optimisation, and in this respect the hypothesis was principally substantiated.

Alan Hankinson
School of Management
Summer 1977

OVERVIEW

PART I
INVESTMENT STRATEGY

PART II
INVESTMENT PERFORMANCE

CONTENTS

PRESENTATION

This work is intended to be practically useful, and is aimed, ultimately, at as wide a readership as possible. Hopefully it will provide all those interested in the promotion of investment activity in the small firm sector, e.g. higher education, industry, government departments, industrial development associations, etc., with a clearer appreciation of the real motivations, and weaknesses, behind investment decision making. Consequently, the material has been presented in a descriptive manner and the evidence has to a large extent been allowed to speak for itself. Tables extracted from the Plymouth Survey data have been based on dominant responses only, and should be interpreted along with the many supplemental paraphrased extracts.

PREFACE

This work has been primarily concerned with the testing of the hypothesis - based upon previous research and actual industrial experience - that the investment performance of small firms is impaired as a result of capital expenditure being motivated more by reaction to events than by conscious strategy. If small firms were indeed intent upon optimum performance, then they would presumably seek to achieve this by sound investment programming. But the results of researching 65 small manufacturing firms in the wider Plymouth area between 1970 and 1975 indicated that firms did, in fact, choose to ignore, and even avoid, certain opportunities to optimise returns on net assets.

For example, the adoption of the main product was basically of traditional origin, and changes in the product mix were extremely rare despite market movements. Diversification too, was unpopular irrespective of the likely benefits. And survival or satisfactory profits only, emerged as fundamental goals.

Investment strategies were somewhat negative or defensive, even if apparent. There was no correlation between investment and the economic climate, and capital expenditure shortfalls could, and should, have been tackled more by resolute management rather than by reliance upon economic upturns. Additionally, the flexibility generally associated with small firms was not observable in respect of short run investment. Indeed, investment was principally passive, non-visionary, and horizontal. Long term

indicators were not in evidence and longer term investment planning was minimal. In fact, investment was determined in the majority of cases by the "necessity criterion".

Firms clearly preferred to use their own funds for investment purposes, and external finance was generally avoided. Firms felt that if governments were to assist them in their investment aspirations, then direct aid was required. Perhaps not surprisingly government monetary policy aimed at stimulating investment levels indirectly, had been largely ineffective. Nevertheless, although indirect regional aid contained certain anomalies, the pro-aid firms produced higher rates of return on net assets than the firms which had not taken advantage of this assistance.

The phrases "cost of capital" and "discount rate" caused some confusion, and in most instances these factors were simply "estimated". Firms were mainly ignorant of discounted cash flow, and even pro-D.C.F. companies were unaware of the mathematical pitfalls. Generally, there was a non-flexible approach to investment appraisal, and methods had not been improved to any great extent over the years, or even revised. Calculations of cash flows were non-rigorous in character, and in some cases suspect. Furthermore, returns on net assets were superior in the firms employing "operations research" methods, yet very few respondents were convinced of the benefits of management techniques, including D.C.F.

Companies set themselves a return on investment target which tended to be rigidly applied. Significantly, just over 60% of the firms failed to reach these targets on an average basis. The firms explained their failure to achieve the target in terms of "external factors" rather

than from inadequacies within the unit itself. Hardly any firms had employed management consultants and were clearly prejudiced against them despite the absence of actual experience, and the fact that rates of return on net assets of the pro-management consultant firms were impressive.

Pricing was based principally upon a rigid cost plus percentage (C+%) determinant, and any flexibility depended upon circumstance rather than policy. Yet flexible pricing did produce superior rates of return. Curiously, few firms were aware of the relationship between target return on net assets and the mark-up on costs. In focussing attention upon costs, four basic L-shaped average cost curves for the four types of small firm were observed. At the same time, four basic market demand curves were also identified, and a Z-shaped curve (apparently absent from the literature) emerged.

Output levels were somewhat rigidly determined, and an S-shaped supply curve typified this inflexibility. In other words, output levels were hardly ever manipulated to achieve optimisation of overall performance despite the fact that flexible output policies produced higher rates of return than firms practising rigidity. Excess capacity averaged 17% for all firms over the period 1970-1975, and although interviewees claimed that profits would be higher at zero excess capacity, very little positive action was taken to eliminate this wastage of resources. Ominously, a negative correlation between excess capacity and the rate of return on net assets was discernible. But remarkably, there was negligible market research, market seeking, or advertising, even though sales growth clearly paid dividends.

Finally, Companies House data revealed that invest-

ment levels were inconsistent and non-programmed. Importantly, a positive correlation between investment$_t$ and profit$_{t-1}$ was noted, and a positive correlation between profit$_t$ and investment$_{t-1}$ similarly prevailed. There was also a significant correlation between returns on net assets and the extent of adoption of a 12 point plan aimed at increasing profitability. Unfortunately, the 12 point plan was not comprehensively employed by the sample firms.

In short, the total evidence strongly suggested that the firms' overall investment behaviour was generally inconsistent with the goal of optimisation.

The full story could, of course, occupy several books and might be summarised in several pages. Any intermediate length provides such difficulties for the writer as to leave him somewhat dissatisfied. Here the usual problems of deciding what to omit and in what way to present the remainder have been intensified by the size of the subject and the multiplicity of its facets. The author's only refuge from his doubts as to whether he has found the best way of achieving what he has attempted is the reflection that the identity of the "best way" is largely a matter of opinion.

At this point, appreciation must be extended to the individual firms who contributed information, documents, and advice, upon which the bulk of this work has been based. But ultimate acknowledgement is accorded to Professor Raymond Thomas of the University of Bath for his expertise, continued constructive criticism and encouragement, without which this thesis could not have been completed, or indeed, commenced. All errors and inadequacies, however, are my own responsibility.

ALAN HANKINSON
PLYMOUTH
SUMMER 1977

PART I

INVESTMENT STRATEGY

CHAPTER I

INTRODUCTION

CHAPTER 1
INTRODUCTION

PREVIOUS SURVEYS AND THEORIES

Prior to the appointment of the Bolton Committee (1) there had never been a comprehensive study, official of otherwise, of the small firm sector in the United Kingdom. This important area is still relatively little researched, and the formulation of industrial policy has inevitably proceeded without adequate knowledge of the functions performed by small firms, of their efficiency, and of the likely effects upon them of the actions of governments.

But, of course, a number of specific surveys covering the role and operation of small firms have been conducted before the appointment of the Bolton Committee. For example, perhaps the most notable was the Oxford Survey (2) which was undertaken in 1956 under the direction of J. A. Bates, H. F. Lydall, and M. J. Stewart, and reported by them in a long series of subsequent publications.

By contrast, the less ambitious Midlands Survey (3) carried out at about the same time by F. R. Jervis was mainly concerned with the finance of private companies.

The Exeter Survey (4) was completed in two stages. A postal inquiry concerning productivity in 1963 was followed by an inquiry in 1966 principally involved with the impact of certain government measures.

More recently, comparisons between firms of differ-

ent size have been carried out by Lund and Miner (5). Their paper attempts to identify the growth and cyclical performances of small firms using the information provided by the Confederation of British Industry's Industrial Trends Surveys. The surveys' results are also used to examine factors such as limitations of output. Comparisons are drawn between firms of different size, and tests of significance are conducted where appropriate.

A particularly relevant survey on investment behaviour of small firms has also been undertaken by Lund and Miner (6). The paper seeks to describe the investment behaviour of small firms and to compare it with that of larger firms.

Additionally, studies in the specialist area of the theory of the firm have also been presented over the years. For example, as long ago as 1929 Berle and Means (7) showed that a managerial revolution was in progress in that ownership was so widely distributed that no one individual or small group had even a minority interest large enough to dominate the affairs of the company. On the other hand, Baran and Sweezy (8) pointed out that there was no justification for concluding that management in general was divorced from ownership in general, a point particularly applicable to many smaller private firms.

However, as a consequence of the role and function of profit in a capitalistically orientated economy, most economists in the course of analysing business behaviour have assumed that firms behaved as if they sought to maximise profits. Traditional theory of the firm, including the small firm, did not merely postulate that profit was a goal of business enterprise, it stated that the goal was maximum profit, and that businessmen would pursue this goal in a rational and deliberate manner. This

stemmed mainly from the work of economists who thought that the two extremes of perfect competition and monopoly were adequate tools for analysing any market. In the latter part of the 1920's beginning with an article by an Englishman, P. Sraffa (9) attempts were then made to develop models to cope with markets between these extremes. This activity stimulated two important pieces of work in the early 1930's: Joan Robinson's "Imperfect Competition" (10), and Edward Chamberlin's "Monopolistic Competition" (11). Very broadly, the traditional theories of the firm described a situation in which the owner-manager of the firm (known as the entrepreneur) possessed perfect knowledge about the internal workings of his firm and about its environment, and proceeded to maximise profit by equating marginal cost with marginal revenue. As a description of the way firms behave today, the above is hardly accurate, but when one attempts to describe how firms do behave in reality, one finds that this is by no means an easy question to resolve. Even the smallest firms tend to be highly complex units in terms of optimum operating levels, and the Plymouth Survey (12) confirmed that decision makers were forced to conduct the affairs of the firm in ways that not only maintained an equitable balance among the claims of the various interested groups, but also reflected the problems of managerial expertise, the market, and lack of strategic planning.

The basis of Leibenstein's (13) concept of X-inefficiency was that human beings were unlike other factors of production. Machines had a potential output which could be achieved by pressing the right switches. Human beings by contrast could adjust the quality and pace of their work in line with their own preferences. By supervision and by incentives, human effort could be varied. There was no reason why a shop-floor worker, or a manager

should have a utility function which coincided with that of the firm as a whole or of its shareholders. Employees could be compelled to produce minimum output, or lose their jobs. There might also be a maximum output of which they could be capable if provided with the correct incentives. But between these levels they could choose to vary the amount of time they spent on various activities, the pace at which they worked, and the quality of the work they did. There was no single-valued relationship between the number of man-hours purchased and the quality of effort that was expended in production. As a result, it was unlikely that every employee's choices would be exercised in such a way as to give maximum output per unit of input. Thus, X-inefficiency almost always existed. Empirical testing has revealed considerable evidence of X-inefficiency and has been reported by Williamson (14), Caves (15), whilst Rowley (16), has provided a detailed bibliography and broad survey of developments based on this concept.

In one of the earliest attempts to push the theory of the firm towards utility maximisation, Papandreou (17) criticised the emphasis in economics on firms as entrepreneurs rather than as organisations. The objective of an organisation would come about as a result of internal and external pressures and would be some kind of amalgam of the preferences of the various sections of the organisation. There would be a "general preference function". Papandreou did not develop a model, but pointed out the problem of getting results from general preference functions unless one could specify their form and measure this. Scitovsky (18) too, helped the move away from profits as a firm's sole motive. In particular, he was worried about the trade-off between entrepreneural effort and profit, and showed that entrepreneurs would maximise profit only if their choice between more income and more leisure was

independent of their income. In other words, the supply of entrepreneurship had to have zero income elasticity.

Baumol (19) forwarded the idea that oligopolistic firms had as their objective the maximisation of sales revenue subject to a profit constraint. Firms preferred to pursue sales revenue rather than profit because managers believed that their salaries, power and standing, both within their own company and the business community as a whole, would be enhanced by the pursuit of the former objective rather than the latter. Pursuit of sales revenue required that ownership be separated from control, but since managers were never entirely free from shareholder influence, a profit constraint was necessary. This sales revenue approach has been challenged by Shepherd (20), Hawkins (21), and Alchian (22). Subsequently, Baumol revised his theory to stress rate of growth of sales revenue rather than levels of sales.

Williamson (23) held the view that growth was never limited by lack of finance as such, but by the fear of take-over. But the Plymouth Survey suggested that lack of internal funds, as opposed to external, was a definite deterrent to investment and subsequent growth. Marris's model (24) was based on the hypothesis that managers were particularly concerned with the growth of the firm since they were likely to see the growth of their own organisations as one of the best methods for satisfying personal needs and ambitions. Furthermore, owner-controlled firms would achieve, on average, lower growth rates and higher profit rates than the management-controlled firms. This work has been further tested and criticised by Radice (25), Monsen, Chui, and Cooley (26), Kamerschen (27), and Solow (28). One criticism of the basic assumption behind growth models is the imperfect operation of the capital market. In a perfect market any firm which pursued growth in a way

which depressed its market value below the level that could be achieved, would be taken over. The growth rate at which take-over would occur would be any rate different from that which maximised profits, and no other motivation could be pursued. The fundamental problem, of course, is that neither shareholders, brokers, nor those who might take the firm over have perfect knowledge of just how high profits could potentially be. For a wide-ranging discussion of the facts behind the market imperfections, Marris (29) should be consulted, and for some empirical tests which suggest that there is a greater liklihood of take-over when share prices are depressed relative to book value, see Kuehn (30), and Singh and Whittington (31).

A possible alternative to maximising the value of sales was instead to maximise volume, i.e. to maximise output. Ames (32) has argued that output maximisation was an acceptable simplification of the motive of most Soviet enterprises, whilst Kafoglis (33) has suggested that output maximisation with a profit constraint might fit the motives of some private firms, and also of public services who might be judged by output, but told to break even. One model which has been shown to yield interesting results and which has links with output maximisation is that of Averch and Johnson (34). They examined the implications of firms, and public utilities, being constrained to make no more than a specified rate of return on capital. The Plymouth Survey found some evidence of output stability rather than output maximisation.

Several theories have revolved around the question of the firm's long run survival. Rothschild (35) stressed firms' desire for secure profits rather than maximum; Fellner (36) argued in terms of safety margins; whilst Day, Aigner, and Smith (37) investigated the possibility of determining a compromise between expected profit max-

imisation and these alleged safety margins, concluding that in general a concern for safety margins led to a departure from conventional rules such as marginal cost = marginal revenue. Pearce and Gabor (38) with a semi-accounting approach have also questioned the validity of marginal theory by proposing that traditional expositions of the theory of the firm did not draw any clear distinctions between the two essential functions of the entrepreneur, namely the provision of money capital, and management.

Reder (39) argued that management might have to accept some form of trade-off between liquidity and profitability where the firm sought to finance its expansion out of internal funds. Dean (40) pointed out that a firm might prefer a less profitable but more liquid investment, and certainly, in the Plymouth Survey the shortage of internal funds was a significant feature of sub-optimum investment. Gordon (41) put forward the view that the fear of bankruptcy and the even more widespread fear of temporary financial embarrassment were probably more powerful drives than the desire for the absolute maximum in profits.

Some theories have even been based on the physical sciences. Firms, like organisms, start small, mature, produce offspring, and eventually die. Such theories have been divided into two groups: viability theory which emphasised long run changes, and theories of homeostasis which stressed short run changes (42). Boulding (43) has held that there was some state of the organism which it was bound to maintain, and any disturbance from this state set in motion behaviour which tended to re-establish the desired stable state. The Plymouth Survey also produced some evidence of stability goals. Biological analyses have been severely criticised by Penrose (44), pointing out that the development of firms just did not proceed according to

the same grim laws as did those of living organisms.

An interesting classification of non-profit maximising objectives, i.e. the desire for leisure, prestige, and conservatism, has been put forward by Higgins (45). Hicks (46) has stated that the best of all monopoly profits was a quiet life, a suggestion subsequently picked up by Scitovsky (47), Nettl (48), and Reder (49). Monsen and Downs (50) suggested that owners sought to maximise profits, whereas managers acted so as to maximise their own lifetime receipts rather than short run incomes.

Thus, observers of contemporary corporate capitalism have advanced a host of alternative and conflicting goals (and the above summary is by no means complete) which conceivably could assist in explaining and predicting the market behaviour of firms. Some of these alternatives, if achieved, would cause profits to be less than they might otherwise have been. Specifically, it has been suggested by a number of observers that business firms aim at a satisfactory rate of profit rather than maximum. In other words, firms satisficed rather than maximised. Theories of satisficing behaviour have been most often associated with Simon (51). Gordon (52) has agreed that the primary aim of a businessman was to stay in business. Margolis's premise (53) was that firms were faced with uncertainty and as a result, a firm might often deliberately ignore opportunities which offered prospects of greater profitability than the opportunities which the firm adopted instead. This was particularly apparent in the Plymouth Survey where, on occasions, sub-satisficing was observed.

The case agianst marginalism, referred to above, has also been developed by Newbury (54), and others. According to the traditional models of competition, the firm determined its output and price by equating marginal

cost with marginal revenue. But if the firm was unable to determine its marginal cost and revenue curves with any accuracy, it would logically be unable to determine its optimal price-output combination. Hall and Hitch (55) showed that many firms used full cost pricing rather than marginal techniques. Their article gave evidence for kinked demand curves as well as for believing that firms set price on a mark-up basis. Since then, a mass of supporting evidence has been accumulated, for example, Heflebower (56), Andrews (57), Wiles (58), Clark (59), Kaplan (60), Markham (61), Fog (62), Lanzillotti (63), Haynes (64), Pearce (65), and the N.B.E.R. studies (66). Early (67), however, attempted to reconcile full cost pricing with marginalist principles if profit could be identified as maximum over the longer term. Margolis (68) indicated that since the information necessary for the management of a firm to move to its equilibrium profit-maximising price-output combination was clearly not available, and that uncertainty was omni-present, then an information gap had to to taken into account in all theories of the firm. Gordon (69) too, felt that uncertainty compounded this lack of information and added the complication of future contingencies.

Dis-satisfaction with traditional theory of the firm led to certain commentators branching out into behavioural theories. The most notable of these is perhaps that presented by Cyert and March (70), in which certain goals were considered to be vital, namely the production; level of sales; market share; inventory; and profit aspirations. In some respects, of course, this approach does contain elements of satisficing. For another example of the bahavioural approach, see Cyert and Kamien (71), and for a model based on the problem of passing information through a large bureaucracy, see Monsen and Downs (72).

Assessments of behavioural versus other approaches to the theory of the firm have been provided by Machlup (73), and briefly by Archibald (74). For a persuasively argued viewpoint on the influence that the bahavioural approach could have on the theory of the firm, see Clarkson (75).

Therefore, whilst theories of the firm have been numerous and wide-ranging, it must be re-stated that prior to the Bolton Report, research into real world behaviour of the smaller business unit had been limited, and studies of small firm investment decision making in the regions had been negligible. It is the aim of this work to make a small contribution to this under-researched field by examining the motivations behind investment decision making in 65 Plymouth area firms, and by testing the hypothesis - based on preliminary research (76) - that levels of investment, and investment returns in the smaller business unit tend to be sub-optimum as a consequence of non-strategic decision making. Throughout the field work, a persistent effort was made to ensure that the data collected was, in fact, representative of how firms actually <u>did</u> behave as opposed to what the numerous theories over the years have claimed.

THE GREATER MANCHESTER STUDY 1971

The thought of surveying managerial decision making in small firms first occurred in 1967 when the writer was attached to a small firm producing different types of gates in the Greater Manchester area. The firm made the usual daily decisions, and some were important, but rarely were these decisions based on quantitative foundations. Occasionally, decisions did not even appear to be logical. For example, pricing was based on gate area irrespective of type; capital investment had sometimes been carried out

regardless of profit; and output levels were, in the main, somewhat rigid despite changes in current demand. Although the main decisions concerning investment, pricing, output, and manpower, usually turned out to be reasonably sound in the sense that the firm was successful, profitable, produced some good work, and expanded its activities, it was clear that the firm was by no means as efficient as it might have been. Discussions with members of the board, who were also the owners, confirmed that a non-strategic and non-quantitative approach to decision making had always been adopted.

During 1971 a study of the relevant literature was carried out for a short course teaching project with Bolton Institute of Technology, and it was interesting to note that researchers almost without exception made the point that inferior management skill was one of the most serious difficulties facing the small firm. For example, in 1948 A. D. H. Kaplan's study (77) pointed out the many problems hindering the small business of which sub-standard managerial expertise was one. In another study, of success and failure of small concerns by Alexander and Woodruff (78) 10 bankrupt firms were compared with 10 profitable ones. The management factor was particularly highlighted in the former. Other studies tended to support this assertion.

As a result of this review of the literature, and the practical experience in a small company, it seemed that research into a selected sample of small firms would be a useful exercise to attempt to assess managerial skill in general; to see how this affected decision making; and to appraise the performance of firms. A random sample of 40 small firms in the Greater Manchester area was investigated during 1971 and the results, although inconclusive, did suggest that suspect management skill appeared

to be prevalent in certain areas, and this in turn, influenced decisions and ultimate performance.

As far as administration was concerned, it was pointed out that there was far too much government bureaucracy in the operation of a business, and the small firm owner spent most of his time filling in forms rather than orders. It certainly did appear that small firms were put under some pressure by government regulations, e.g. taxation, and especially the firm with the minimum of office staff. It was also claimed, for example, that the 1965 Finance Act which brought in corporation tax and capital gains tax was more severe than the previous tax system. Additionally, the 1966 Finance Act which imposed selective employment tax, was held responsible for the financial problems of many small firms in that particular industry. Most of the sample 40 firms felt that taxation was too high, and removed all incentive for ploughback of profits into investment. Indeed, this issue was to arise again in the 1975 Plymouth Survey. Also, the large amount of form filling and paper work generally, placed a fairly heavy burden on the small firm. In some instances, firms had to employ part-time staff to deal with forms, questionnaires, and returns from local and central government departments.

Firms complained that facilities for raising credit were against the small firm, although in the main, these firms disliked having to resort to external credit in the first place. Managers appeared to be quite willing to invest their own funds, but somewhat reluctant to invest finance supplied externally, even if likely to be profitable. External credit tended to be small when required, but, during difficult periods, more often than not, exceeded that which the bank was willing to consider. Some firms claimed that occasionally credit could be raised privately,

but again, they preferred not to do this since it could be expensive, and lead to some measure of external control. Other firms, who would have considered outside credit, felt that they were likely to be turned down simply because they were small firms. Most of the firms were in favour of some form of tax relief to improve retained earnings and ploughback.

The phrase "management operations research techniques" did not always promote a response. However, when such examples as stock control, equipment replacement, break-even analysis, financial budgets, production flows, and others, were suggested, the firm usually claimed that it did use techniques which were adequate for that particular firm, or more often than not, did not need such methods for a firm of that particular size and form. Not one firm said that it would use management consultants even if the firm reached a position where it could not cover its variable costs on main production. Two main reasons were given for this; management consultants' fees were excessive for the value given, and management consultants could not possibly understand the complexities of the firm better than the decision makers in that firm.

A small firm attached to the building trade made the point that local authority direct labour often provided unfair competition to small local builders, and indeed, to other industries. Apparently, local authorities had not always been implementing the Ministry of Housing circular 57/69 which required local authorities to give work to direct labour only after consultation with builders for a "considerable and representative proportion" of that work. This particular problem has now been resolved to some extent, but it is worth noting the above since it does indicate just one of the infinite difficulties that face small firms from time to time.

Small firms in the textile industry complained that the industry was too concentrated, and heavily burdened by the trade cycle. The fact that Courtaulds were responsible for over one third of the profit in textiles meant that Courtaulds's price cutting on occasional contracts hit small firms in the United Kingdom much harder than overseas competition. A fundamental problem was that although the small firm in textiles could be successful on small orders, it could never really compete in the high quality markets.

Investment appraisal tended to be a fairly weak area. Traditional assessment was made to evaluate the viability of investment projects, e.g. payback, but in many cases the calculation requirement was not too involved, and informed guesses could be made. However, it was generally admitted that on fairly expensive capital spending, no real attempt was made to assess cash flow potential. Certain firms claimed they approached outsiders, e.g. auditors, for advice from time to time, but it was not obvious that discounted cash flow techniques were widely used. Firms usually opted for pure profit rather than cash flow when offered the choice. Yet some firms agreed that one of the major reasons for failure was shortage of cash. It was clear that practically all the firms interviewed did not really appreciate the significance of discounted cash flow techniques. In fact, there was no real attempt to assess basic cash flow allowing for risk, allowances, taxation, and depreciation. Despite this, however, some firms did recognise the perils of over-trading which ultimately, through the operation of the Domar effect, could place great strains on liquidity.

Costing was organised to the extent that it tended to serve the requirements of the firm, and decision makers were convinced that their costing calculations and projections

were adequate. Indeed, most firms prepared a "budget" but rarely for the longer term. Pricing tended to be either based on historical data, or specifically on cost of production, and very infrequently on what the market would pay, despite claims to the contrary. Knowledge of break-even analysis was apparent in that a distinction was usually made between fixed and variable costs, but the general rule was that as long as variable costs were covered, then fixed costs could be ignored. No attempt was made to find an optimum output level based on demand. Of course, the break-even chart cannot be developed without accurate data, and this was not always available, reliable, or constant. It will be recalled that Margolis (79) had stressed the problems of information gaps. In the main, a heuristic approach was adopted, the methods used being rule of thumb procedures which did not guarantee optimality, but which at least, provided answers more quickly and possibly less expensively than any other technique. If a specific and identifiable costing and estimating system was employed, it tended to be an informal one, e.g. based on the time taken to complete an operation. Details on profit were fairly difficult to obtain both because of the nature of financial records, and because of conceptual difficulties of definition and actual measurement. But it appeared on the surface that large pre-tax profits were not made.

A decided advantage of the type of firm in question was flexibility. A distinction, however, had to be drawn at the outset between flexibility of method, and flexibility of policy. Both proved to be rather rigid. However, long term policies or strategies tended to be somewhat informal, and thus capable of change. On the other hand, it was claimed that periodic revision of methods and policies was carried out only when required, and not simply for

the sake of change. Nevertheless, this answer seemed to imply that any change which was implemented was either too late, inadequate, or forced onto the firm by events or crises. This basic inflexibility predominated, and was further taken up in the Plymouth Survey. Probably this problem applied to all firms at some time or other, but with these particular small firms the capacity to react and rectify short run problems was rather more limited than had been supposed. Despite this, managers believed that their ability to meet change was adequate. For example, a price quoted for a contract could be amended if required at short notice. To the decision maker, this represented a reasonable degree of flexibility. However, this ability to make instant pricing decisions did not appear to make the firm any more profitable in view of the comments about the difficulties of operating a small firm in 1970.

Generally, the firms seemed aware that more small firms had gone out of business during the period 1966 to 1968, and fewer had been formed during 1968 than 1966 and 1967, as the following table confirmed.

Table 1.1 Companies Newly Registered and Struck Off 1966 to 1968

Year	New Registrations	Struck Off or Dissolved
1966	27,058	10,872
1967	30,125	17,068
1968	19,767	36,036

Source: Board of Trade Companies Report 1968

But there was no firm, including one on the verge of bankruptcy, which considered itself a candidate for failure despite constant references to difficult business conditions. The textile firms stressed that the trade cycle which operated in their industry caused eratic profits,

and it was felt that firms leaving the industry were probably caught in a severe short run downswing which could not be counteracted easily. This hinted at the already mentioned inflexibility problem. All agreed with the suggestion that the efficient firm was unlikely to fail, but some interviewees seemed to confuse efficiency with basic "know how". Of course, this latter factor was a quality which had to be acknowledged, and admired. Indeed, the impression was clear that these small firms were a source of enterprise and innovation, but the economic climate was occasionally against them, and managements had found it difficult to cope.

It seemed possible that some instances of failure in other small firms could have resulted, at least in part, from an absence or lack of managerial expertise. In the very small firms, the owner-manager had to be a combination of engineer, accountant, secretary, administrator, salesman, and personnel officer. Interviewees showed a remarkable willingness to accept these responsibilities, but could hardly be expected to fulfil these duties expertly. Also, it certainly did not follow that managements were unintelligent, lax, or uneducated, but it was equally apparent that many elements of decision making which had to be dealt with competently, just could not be handled by key and delegated personnel.

Thus, the results indicated that managerial skill in the purest sense was not high, and paved the way for a deeper analysis. However, it must be admitted that in some firms modern techniques could not easily be applied, and the effectiveness of basic know how and experience, as opposed to specific techniques, could not be denied. Most managers claimed that their calculations and systems were adequate for that particular firm, and quoted continued existence, expansion, and profitability, in support. Comments from interviewees gave the impression that failures of small

firms could be due more to outside factors, e.g. government impositions and lack of assistance, trade cycle effects, etc., rather than poor management.

However, it seemed reasonably safe to conclude from the data that small firms experienced severe problems of various kinds, not least managerial skill, but managed to overcome some of these by adopting policies of adjustment, trial and error, and limited flexibility. The fact that the firms in question had remained in business was some evidence of their satisficing approach. But to what extent did this satisficing produce optimum levels of investment and optimum returns? This is, of course, the substance of the hypothesis under review in the Plymouth Survey.

SUMMARY

PREVIOUS SURVEYS A limited number of surveys of the small firm sector in the United Kingdom have been undertaken, but despite the Bolton Report, this important area is still relatively little researched. And studies of small firm investment decision making in the regions have been negligible.

PREVIOUS THEORIES Contributors have forwarded a host of theories of the firm covering such areas as profit maximisation, X-inefficiency, utility maximisation, sales revenue maximisation subject to a profit constraint, asset growth, output maximisation, long run survival, liquidity versus profitability trade-off, stability, full cost pricing, uncertainty, behavioural theory, and satisficing. One objective of this thesis is to identify, if possible, the most relevant of the above theories.

THE GREATER MANCHESTER STUDY During 1971 a study of managerial decision making was undertaken by the writer in 40 firms in the Greater Manchester area. Results of this informal survey indicated that managerial skill in the purest sense was not high, but to what extent this finding affected investment optimality remained unknown at this stage.

REFERENCES

(1) "Small Firms", Report of the Committee of Inquiry on Small Firms, Chairman J. E. Bolton, Nov. 1971, Cmnd. 4811.

(2) Refer Committee of Inquiry on Small Firms Research Report No. 11, "Three Studies on Small Firms", P. Lund and D. Miner, H.M.S.O. p 42.

(3) F. R. Jervis, "Private Company Finance in the Post-War Period", Manchester School, 25, 1957, pp 190-211.

(4) D. C. Corner, "Financial Incentives in the Smaller Business", Occasional Papers in Social and Economic Administration, No. 5, London Edutext Publications, 1967.

(5) P. Lund and D. Miner, Committee of Inquiry on Small Firms Research Report No. 11, "Comparisons Between Firms of Different Size Using the C.B.I. Industrial Trends Surveys", 1971, H.M.S.O., pp 47-78.

(6) P. Lund and D. Miner, "The Investment Behaviour of Small Firms", Committee of Inquiry on Small Firms Research Report No. 11, 1971, H.M.S.O., pp 83-123.

(7) A. A. Berle and G. Means, "The Modern Corporation and Private Property", New York, 1932, revised edition New York, Harcourt, Brace, and World, 1968.

(8) P. Baran and P. Sweezy, "Monopoly Capital", Pelican, 1968, p 46.

(9) P. Sraffa, "The Laws of Returns Under Competitive Conditions", Economic Journal, Dec. 1926.

(10) J. Robinson, "The Economics of Imperfect Competition", Macmillan, London, 1933.

(11) E. H. Chamberlin, "The Theory of Monopolistic Competition", Harvard U. P., Cambridge, Mass., 1933.

(12) A. Hankinson, "The Investment Behaviour of the Smaller Manufacturing Business Unit in the Plymouth Area 1970-1975", (The Plymouth Survey), Ph.D. Thesis, Univ. of Bath, unpublished as at 1977.

(13) H. Leibenstein, "Allocative Efficiency vs. X-inefficiency", American Economic Review, June 1966.

(14) O. E. Williamson, "Managerial Discretion and Business Behaviour", American Economic Review, Dec. 1963.

(15) R. Caves et al., "Britain's Economic Prospects", Brookings Institution, Washington, D. C., 1968.

(16) C. K. Rowley, "Antitrust and Economic Efficiency", Macmillan Studies in Economics, Macmillan, London, 1973.

(17) A. Papandreou, "Some Basic Problems in the Theory of the Firm", in B. F. Haley (Ed) A Survey of Contemporary Economics, Vol. II, Irwin, Homewood, Ill., 1952.

(18) T. Scitovsky, "A Note on Profit Maximisation and its Implications", Review of Economic Studies, 1943, reprinted in American Economic Association, "Readings in Price Theory", Allen and Unwin, London, 1953.

(19) W. J. Baumol, "On a Theory of Oligopoly", Economica, 1958.

(20) W. G. Shepherd, "On Sales Maximising and Oligopoly Behaviour", Economica, 1962, pp 420-424.

(21) C. J. Hawkins, "The Sales Revenue Maximisation Hypothesis", Journal of Industrial Economics, April 1970, pp 135-138.

(22) A. A. Alchian, "The Basis of Some Recent Advances in the Theory of Management of the Firm", Journal of Industrial Economics, Nov. 1965, pp 30-41.

(23) J. H. Williamson, "Profit, Growth, and Sales Maximisation", Economica, Feb, 1966.

(24) R. Marris,"Why Economics Needs a Theory of the Firm", Economic Journal, March 1972, special issue, pp 321-352; "The Economic Theory of Managerial Capitalism", Macmillan, 1964; "A Model of the Managerial Enterprise", Quarterly Journal of Economics, May 1963, pp 185-210.

(25) H. K. Radice, "Control Type Profitability and Growth in Large Firms", Economic Journal, Sept. 1971, pp 547-562.

(26) J. S. Chui, D. E. Cooley, and R. J. Monsen, "The Effect of Separation of Ownership and Control on the Performance of the Large Firm", Quarterly Journal of Economics, 1968, pp 435-451.

(27) D. R. Kamerschen, "A Theory of Conglomerate Mergers - Comment", Quarterly Journal of Economics, Nov. 1970, pp 668-673.

(28) R. M. Solow, "The Truth Further Refined - A Comment on Marris", The Public Interest, Spring 1968, pp 47-52.

(29) R. Marris, "The Economic Theory of Managerial Capitalism", Macmillan, London, 1964.

(30) D. A. Kuehn, "Stock Market Valuation and Acquisitions: An Empirical Test of One Component of Managerial Utility", Journal of Industrial Economics, April 1961.

(31) A. Singh and G. Whittington, "Growth, Profitability, and Valuation", Cambridge U. P., 1968.

(32) E. Ames, "Soviet Economic Processes" Irwin, Homewood, Ill., 1965; reprinted in G. C. Archibald (Ed) "The Theory of the Firm", Penguin, Harmondsworth, 1971.

(33) M. J. Kafoglis, "Output of the Restrained Firm", American Economic Review, Sept. 1969.

(34) H. Averch and L. L. Johnson, "Behaviour of the Firm Under Regulatory Constraint", American Economic Review, Dec. 1962.

(35) K. W. Rothschild, "Price Theory and Oligopoly", Economic Journal, Sept. 1947, pp 308-309.

(36) W. Fellner, "Competition Among the Few", New York, Alfred A. Knopf, 1949, pp 153-154.

(37) D. J. Aigner, R. H. Day, and K. R. Smith, "Safety Margins and Profit Maximisation in the Theory of the Firm", Journal of Political Economy, Dec. 1971.

(38) A. Gabor and I. F. Pearce, "A New Approach to the Theory of the Firm", Oxford Economic Papers, 1952.

(39) M. W. Reder, "A Reconsideration of the Marginal Productivity Theory", Journal of Political Economy, 1947.

(40) J. Dean, "Managerial Economics", Englewood Cliffs, N. J., Prentice Hall, 1951.

(41) R. A. Gordon, "Short Period Price Determination in Theory and Practice", American Economic Review, June 1948, pp 280-281.

(42) L. S. Burns, "Recent Theories of the Behaviour of Business Firms", Univ. of Washington Business Review, Oct. 1959, pp 30-40; A. G. Papandreou, "Some Basic Problems of the Theory of the Firm", Survey of Contemporary Economics, B. Haley (Ed) 1952, p 212.

(43) K. Boulding, "A Reconstruction of Economics", New York, John Wiley, 1950, pp 26-27.

(44) E. Penrose, "Biological Analogies in the Theory of the Firm", American Economic Review, Dec. 1952, pp 804-820.

(45) B. Higgins, "Elements of Indeterminancy in the Theory of Non-Perfect Competition", American Economic Review, Sept. 1939, pp 468-479.

(46) J. R. Hicks, "Annual Survey of Economic Theory - The Theory of Monopoly", Econometrica III, Jan. 1935, pp 1-20.

(47) T. Scitovsky, "A Note on Profit Maximisation and its Implications", Review of Economic Studies, 1943.

(48) J. P. Nettl, "A Note on Entrepreneural Behaviour", Review of Economic Studies, Feb. 1957, pp 87-94.

(49) M. W. Reder, "A Reconstruction of the Marginal Productivity Theory", Journal of Political Economy, 1947.

(50) A. Downs and R. J. Monsen, "A Theory of Large Managerial Firms", Journal of Political Economy, June 1965, pp 221-236.

(51) H. A. Simon, "New Developments in the Theory of the Firm", and "Theories of Decision Making in Economics and Behavioural Science", American Economic Review, May 1962; June 1959.

(52) R. A. Gordon, "Short Period Price Determination in Theory and Practice", American Economic Review, June 1948, pp 270-271.

(53) J. Margolis, "The Analysis of the Firm, Rationalisation, Conventionalism, and Behaviourism", Journal of Business, July 1958, pp 187-199.

(54) F. D. Newbury, "A Businessman's Reaction to the Theory of Monopolistic Competition", as quoted in W. W. Cooper, "Theory of the Firm - Some Suggestions for Revision", American Economic Review, 1949, p 87.

(55) R. L. Hall and C. T. Hitch, "Price Theory and Business Behaviour", Oxford Economic Papers, May 1939, pp 12-45.

(56) R. B. Heflebower, "Full Costs, Cost Changes, and Prices", National Bureau of Economic Research, "Cost Behaviour and Price Policy", New York, 1963.

(57) P. W. S. Andrews, "Manufacturing Business", Macmillan, London, 1949.

(58) P. J. D. Wiles, "Price, Cost, and Output", Basil Blackwell, Oxford, 1961.

(59) J. M. Clark, "Competition as a Dynamic Process", Brookings Institution, Washington D. C., 1961.

(60) A. D. A. Kaplan, J. B. Dirlam, and R. F. Lanzillotti, "Pricing in Big Business - A Case Approach", Brookings Institution, Washington D. C., 1958.

(61) J. Markham, review of (60) above in American Economic Review, June 1959.

(62) B. Fog, "Industrial Pricing Policies", trans. I. E. Bailey, North Holland Publishing Co., Amsterdam 1960.

(63) R. F. Lanzillotti, "Pricing Objectives in Large Companies", American Economic Review, Dec. 1958; and "Pricing Objectives in Large Companies - Reply", American Economic Review, Sept. 1959.

(64) W. W. Haynes, "Pricing Practices in Small Firms", Southern Economic Journal, April 1964.

(65) I. F. Pearce, "A Study in Price Policy", Economica, 1956.

(66) National Bureau of Economic Research, "Cost Behaviour and Price Policy", New York, 1963, and National Bureau of Economic Research, "Business Concentration and Price Policy", Princeton U. P., 1955.

(67) J. S. Earley, "Marginal Policies of Excellently Managed Companies", American Economic Review, March 1956 as reprinted in "Readings in Economics", (Ed) H. Kohler, No. 47, p 402, New York, Holt, Rinehart, and Winston, 2nd. Edn. 1969.

(68) J. Margolis, "The Analysis of the Firm, Rationalism, Conventionalism, and Behaviourism", Journal of Business, July 1958, p 189.

(69) R. A. Gordon, "Short Period Price Determination in Theory and Practice", American Economic Review, June 1948, p 287.

(70) R. M. Cyert and J. G. March, "A Behavioural Theory of the Firm", Englewood Cliffs, N. J., Prentice Hall, 1965.

(71) R. M. Cyert and M. I. Kamien, "Behavioural Rules and the Theory of the Firm", in A. Phillips and O. E. Williamson (Eds) "Prices: Issues in Theory, Practice, and Public Policy", Pennsylvania U. P., Philadelphia, 1967.

(72) R. J. Monsen and A. Downs, "A Theory of Large Managerial Firms", Journal of Political Economy, June 1965.

(73) F. Machlup, "Theories of the Firm: Marginalist, Behavioural, Managerial", American Economic Review, March 1967.

(74) G. C. Archibald (Ed) "The Theory of the Firm", Penguin Books, Harmondsworth, 1971.

(75) G. P. E. Clarkson, "Interactions of Economic Theory and Operations Research", in A. R. Oxenfeldt (Ed) "Models of Markets", Columbia U. P., New York, 1963, and in G. P. E. Clarkson (Ed) "Managerial Economics", Penguin Books, Harmondsworth, 1968.

(76) A. Hankinson, "Investment, Price, and Output Decision Making in the Small Firm", (incorporating The Greater Manchester Study), M.Phil. thesis, Southampton Univ., 1974. (unpublished as at 1977)

(77) A. D. H. Kaplan, "Small Business - Its Place and Problems", McGraw-Hill, 1948.

(78) A. M. Woodruff and T. G. Alexander, "Success and Failure in Small Manufacturing - A Study of 20 Small Manufacturing Concerns", Pittsburgh, U. P., 1958.

(79) J. Margolis, "The Analysis of the Firm, Rationalism, Conventionalism, and Behaviouralism", Journal of Business, July 1958.

CHAPTER 2

THE PLYMOUTH SURVEY

CHAPTER 2
THE PLYMOUTH SURVEY

INTRODUCTION

How should a small firm be defined? How was the Plymouth Survey organised? What were the objectives of the questionnaire? How were interviewing problems dealt with? Which firms were eventually included in the 65 firm sample? How relevant was the 1971 Greater Manchester Study? How were interviewees selected? To what extent did academic background and age influence the quality of decision making? Were dates of company formation important? What were the reasons for firms concentrating on their main and diversified products? Did firms experience production run problems? What were the main and subsidiary policies of the firms? To what extent had these policies been successful? Were the firms in question satisficers? The intention of Chapter 2 is to examine these issues.

THE SMALL FIRM SECTOR DEFINED

The Bolton Committee (1) pointed out that the small firm sector was extremely large and heterogeneous. By any standard small firms accounted for, numerically, the vast majority of all business enterprises. Small firms were present in virtually every industry. There was also extreme variation within the sector as regards efficiency, methods

of operation, the nature of the market served, and the size of the resources employed. Faced with these facts it was obvious at the outset that the selection of representative small firms for investigation might be dificult. For example, the Bolton Committee defined small firms according to the following table.

Table 2.1 The Small Firm Sector Defined

Industry	Statistical Definition of Small Firms
(a) Manufacturing	200 employees or fewer
(b) Retailing	Turnover £50,000 per annum or less
(c) Wholesale Trades	Turnover £200,000 per annum or less
(d) Construction	25 employees or fewer
(e) Mining & Quarrying	25 employees or fewer
(f) Motor Trades	Turnover £100,000 per annum or less
(g) Mics. Services	Turnover £50,000 per annum or less
(h) Road Transport	5 vehicles or fewer
(i) Catering	All - excluding multiples and brewery managed public houses

Source: Bolton Report, p 3.
Reports on the Census of Production and Distribution.

For the purpose of the Plymouth Survey (2) definition (a) above was selected, i.e. small firms in manufacturing industry employing up to 200 employees, but with an additional small sample of firms with over 200 employees to add balance, and to enable some comparison to be made.

SELECTION OF THE PLYMOUTH SURVEY SAMPLE FIRMS

It was essential, of course, that the sample be representative and eight tests of significance were devised to

ensure this. Since the survey was concerned with manufacturing industry only, a suitable selection of industrial groupings had to be decided. The Bolton Report concentrated on eight specific areas taken from the total Standard Industrial Classification list 1968. Table 2.2 below demonstrates this.

Table 2.2 Total Standard Industrial Classification Groupings

Complete S.I.C. Groups		Eight Standard Groups as per Bolton Report
I	Agriculture and Forestry and Fishing	
II	Mining and Quarrying	
III	Food, Drink, and Tobacco	FOOD DRINK & TOBACCO
IV	Coal and Petroleum	
V	Chemicals and Allied Industries	CHEMICALS & ALLIED INDUSTRIES
VI	Metal Manufacture	METAL MANUFACTURE & METAL GOODS
VII	Mechanical Engineering	MECHANICAL & MARINE ENGINEERING
VIII	Instrument Engineering	
IX	Electrical Engineering	ELECTRICAL ENGINEERING
X	Shipping and Marine Engineering	
XI	Vehicles	
XII	Metal Goods	
XIII	Textiles	TEXTILES LEATHER CLOTHING FOOTWEAR
XIV	Leather and Fur	
XV	Clothing and Footwear	

Table 2.2 (Continued)

Complete S.I.C. Groups		Eight Standard Groups as per Bolton Report
XVI	Bricks, Pottery, Glass, Cement.	BRICKS POTTERY GLASS
XVII	Timber and Furniture	
XVIII	Paper and Printing	
XIX	Other Manufactured Goods	OTHER MANUFACTURED GOODS
XX	Construction	
XXI	Gas, Electricity, and Water	
XXII	Transport and Communication	
XXIII	Distribution Trades	
XXIV	Insurance, Banking, and Finance	
XXV	Professional and Scientific	
XXVI	Miscellaneous	
XXVII	Public Administration and Defence	

Sources: 1968 Standard Industrial Classification. Report of the Committee of Inquiry on Small Firms, Nov. 1971, Cmnd. 4811.

Thus, the eight industrial groups were finalised at F.D.T., C.A.I., M.M.M., M.M.E., E.E., T.L.C.F., B.P.G., and O.M.G. And the same approach was adopted in respect of the Greater Manchester Study (3). Table 2.3 below summarises the position.

Table 2.3 Eight Standard Industrial Groups and Classification Numbers

Groupings	Classification Numbers
Food, Drink, & Tobacco	III
Chemicals & Allied Industries	V
Metal Manufacture & Metal Goods	VI XII
Mechanical & Marine Engineering	VII VIII X
Electrical Engineering	IX
Textiles, Leather, Clothing, and Footwear	XIII XIV XV
Bricks, Pottery, & Glass	XVI
Other Manufactured Goods	IV XI XVIII XIX XVII

Source: 1968 Standard Industrial Classification. Report of the Committee of Inquiry on Small Firms, Nov. 1971, Cmnd. 4811.

The spread of firms over the eight industrial groups in the wider Plymouth area had to be known in order that the sample might correspond (TEST 1). However, the distribution of the labour force (TEST 2) was also relevant since, for example, although the number of firms in the MME group constituted 23% of the total, 58% of the labour force was employed in this industry. Similarly, 27% of the total number of firms were in OMG, but the labour force in this group was a mere 5%. These, and other statistics, were supplied by the Plymouth Department of Employment. Thus, to determine the final sample, these two factors were taken into account. The other six requirements were as follows:-

A parabolic total distribution of firms by degree of production run "A", "B", "C", and "D", where "A" is the specialist one-off firm, and "D" is the repeater (TEST 3).

A hyperbolic total distribution of firms by 0-24 25-99, 100-199, and 200+ employee groups (TEST 4).

A parabolic industrial group distribution of firms by degree of production run (TEST 5).

A parabolic employee group distribution of firms by degree of production run (TEST 6).

An acceptable employee group distribution in the eight industrial groupings (TEST 7).

And an acceptable age of firm distribution (TEST 8).

Clearly, the more tests involved and the more difficult it becomes to conform exactly with the "ideal" sample. A change in one section to satisfy a test, automatically imbalances others. Thus, it was utlimately considered necessary to permit the actual final sample to correspond with the "ideal" to within + or - 2, as shown in Table 2.4

The Industrial Liaison Officer at Plymouth Polytechnic provided a comprehensive list of small firms in the area. Letters were prepared requesting interviews, and forwarded to firms in the eight agreed S.I.C. groups. There was an 11% positive response and the interviews commenced in November 1974 with a pilot study of six firms. The pilot questionnaire consisted of 10 main sections:- (i) basic data; (ii) investment strategy; (iii) investment determinants and influences; (iv) investment decisions; (v) investment appraisal; (vi) investment appraisal examples; (vii) rate of return on investment; (viii) sources of investment funds; (ix) outside specialist investment advice; and (x) investment problems 1970-1975. Reference should be made to Appendix I. Three main problems arose. The information given tended to be difficult to allocate to the sections making eventual analysis questionable. The data seemed to be incomplete and shallow. And the accounting material offered appeared to be unreliable and approximate. Therefore, the questionnaire was redrafted and extended (reference should be made to APPENDIX II) in order to eliminate as much as possible the problems

encountered in the pilot. It was also decided to obtain the accounting data from Companies House, London, rather than from the individual firms. With a suitable questionnaire finally adopted, the interviews proceeded.

Some firms requested that the questionnaire be forwarded to them by post. This was done and a number were returned. However, only a small minority were used in the final sample, these being fairly comprehensively completed. It was felt that certain advantages might be gained by including a small amount of postal data in the work in that valuable travelling time could be saved, leaving the writer free to concentrate on other interviews, and that the detail supplied could be supplemented, if required, by telephone calls, covering letters, and documents. This approach had been noted from Tamari's (4) successful postal research for the Bolton Committee. Eventually, by June 1975, a 65 firm sample sympathetic with the eight tests emerged as follows:-

Table 2.4 The Plymouth Survey Sample Firms Distribution

S.I.C. No.	S.I.C. Group	No. of Firms in Plym'th Manfg. Industry	Group by Bolton Report Adoption.	% Lab'r Force in Plym'th Manfg. Industry	Lab'r Weight Adjustment Factor	Final 65 Sample Distr. Required
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		TEST 1		TEST 2		
III	F.D.T.	29	29	11.0	1.110	10
V	C.A.I.	6	6	1.5	1.015	2
VI	M.M.M.	0	1	0.1	1.001	0
XII	M.G.	1				
VII	M.E.	24	35	58.0	1.580	21
VIII	I.E.	4				
X	S & M	7				

Table 2.4 (Continued)

S.I.C. No.	S.I.C. Group	No. of Firms in Plym'th Manfg. Industry	Group by Bolton Report Adoption	% Lab'r Force in Plym'th Manfg. Industry	Lab'r Weight Adjustment Factor	Final 65 Sample Distr. Required
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		TEST 1		TEST 2		
IX	E.E.	11	11	14.7	1.147	5
XIII	T.	4	16	7.5	1.075	6
XIV	L.	1				
XV	C & F	11				
XVI	B.P.G.	14	14	2.2	1.022	5
IV	C & P	1	42	5.0	1.050	16
XI	V	6				
XVIII	P & P	28				
XIX	O.M.G.	7				
Totals:-		154	154	100.0		65

(NB) $(7) = \frac{(4) \times (6) \times 65}{\text{Sum of } (4) \times (6)}$ Column (7) within + or - 2.

Sum of (4) X (6) = 183

Source: Department of Employment, Plymouth. As at 12 March 1975. Firms with over 5 employees.

Table 2.5 Plymouth Survey 65 Firm Sample Distribution Required and Actual - Tests 1 and 2

S.I.C. Groups	Final 65 Firm Sample Distribution Required	Final 65 Firm Sample Distribution ACTUAL (+/-2)
F.D.T.	10	8
C.A.I.	2	2
M.M.M.	0	0
M.M.E.	21	23
E.E.	5	5
T.L.C.F.	6	5
B.P.G.	5	4
O.M.G.	16	18
Totals:-	(65)	(65)

Source: Plymouth Survey Questionnaires; Question 4.

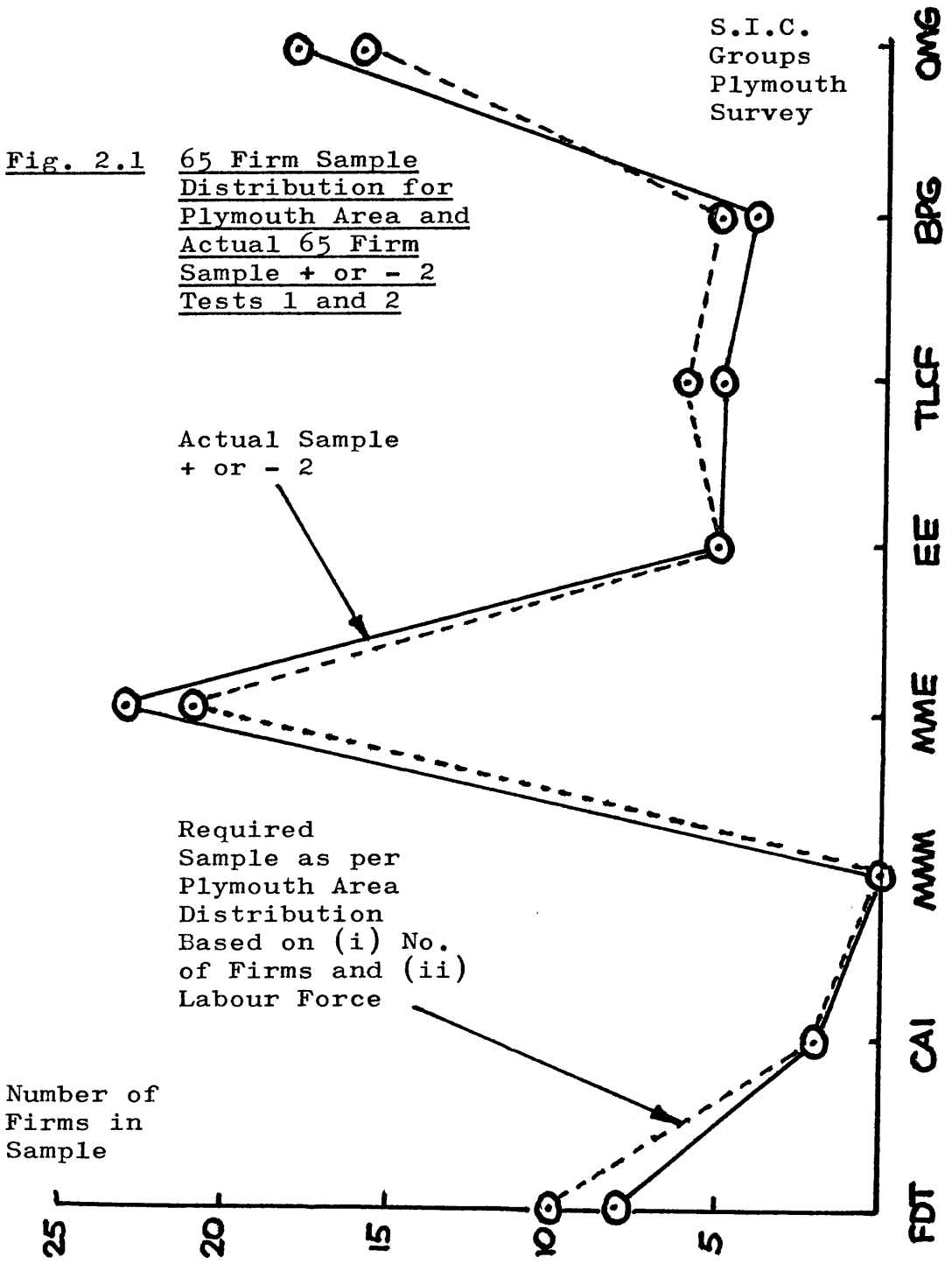


Fig. 2.1 65 Firm Sample Distribution for Plymouth Area and Actual 65 Firm Sample + or - 2 Tests 1 and 2

Source: Plymouth Survey Questionnaires; Question 4.

Table 2.6 Parabolic Total Distribution of Firms by Degree of Production Run A, B, C, or D. - Test 3.

Degree of Production Run	Parabolic Sample Required	Actual Sample Distribution	
A (Specialiser)	12	9	(Negligible runs)
B (Differentiator)	20	21	(Restricted runs)
C (Standardiser)	20	22	(Extended runs)
D (Repeater)	13	13	(Continuous runs)
Totals:-	(65)	(65)	

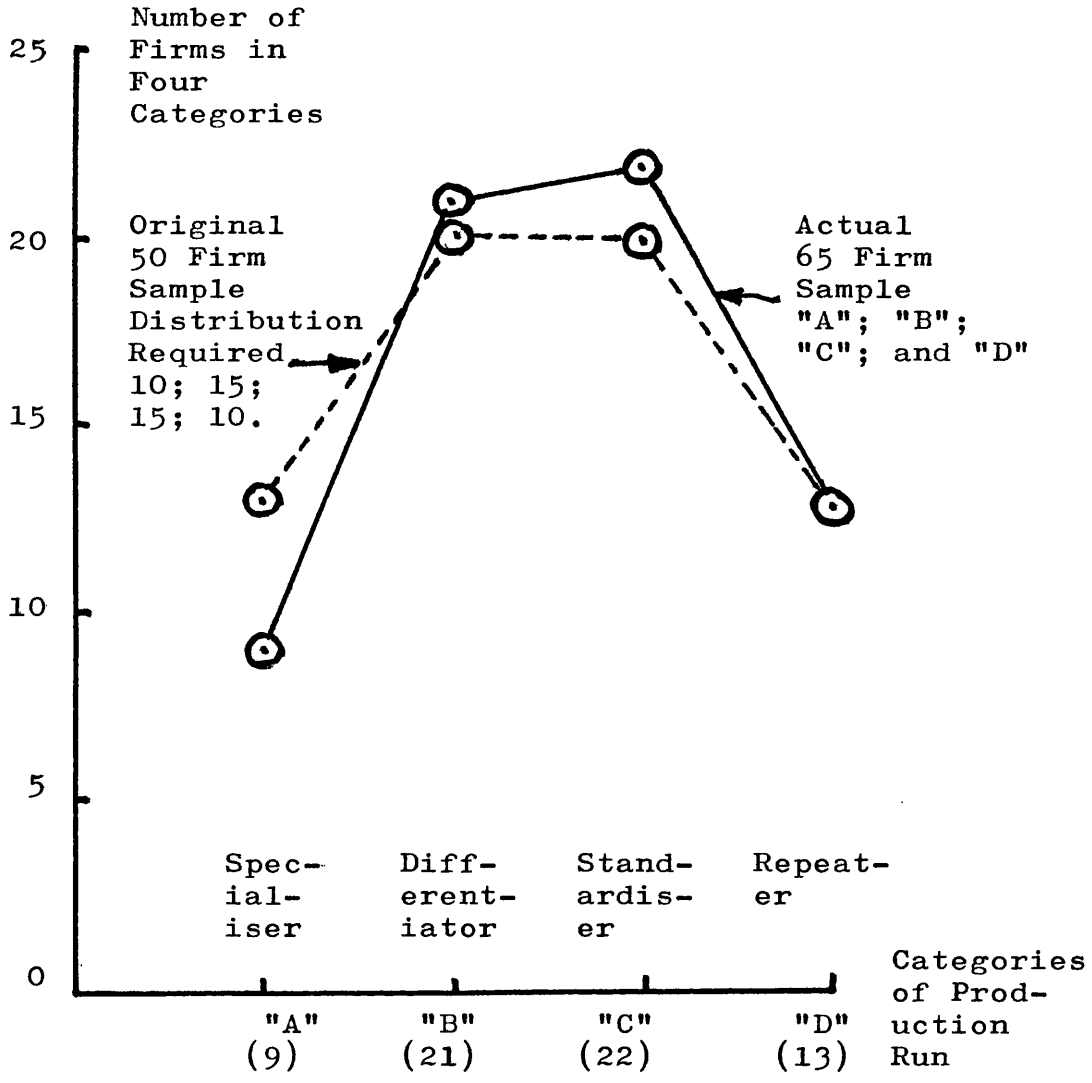
Source: Plymouth Survey Questionnaires; Questions 7, 85, and 89.

Table 2.7 Hyperbolic Total Distribution of Firms by Employee Groups 0-24; 25-99; 100-199; and 200+ Test 4.

Employee Groups	Hyperbolic Sample Required	Actual Sample Distribution
0-24	29	26
25-99	17	18
100-199	11	12
200 +	8	9
Totals:-	(65)	(65)

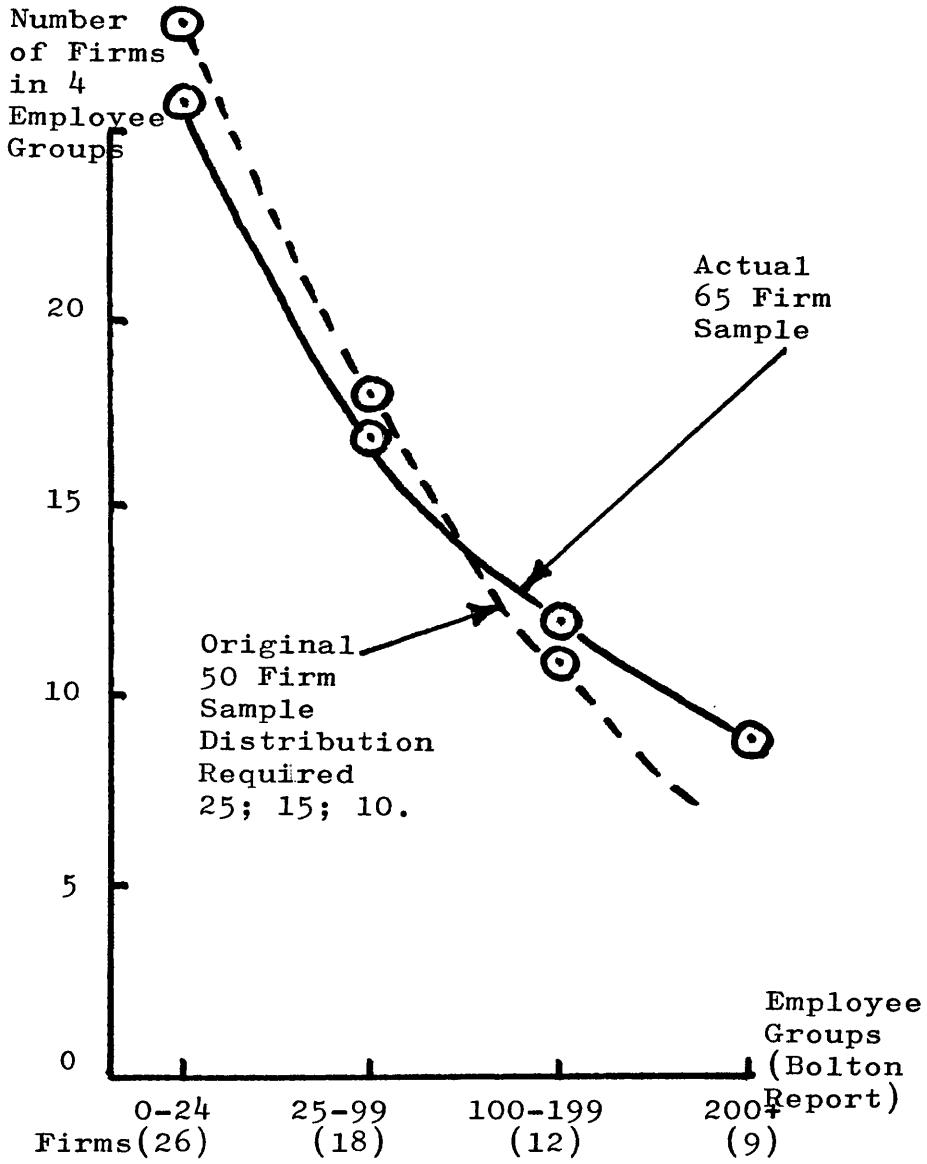
Source: Plymouth Survey Questionnaires; Questions 1 and 14.

Fig. 2.2 Parabolic Total Distribution of Firms by Degree of Production Run Test 3



Source: Plymouth Survey Questionnaires; Questions 7, 85, and 89.

Fig. 2.3 Hyperbolic Total Distribution of Firms by Employee Groups Test 4



Source: Plymouth Survey Questionnaires; Questions 1 and 14.

Table 2.8 Parabolic Industrial Group Distribution of Firms by Degree of Production Run "A", "B", "C" or "D". Test 5.

S.I.C. Group	Actual Sample Degree of Production Run				
	A	B	C	D	Totals
F.D.T.			4	4	8
C.A.I.				2	2
M.M.M.					
M.M.E.	6	10	6	1	23
E.E.		3	2		5
T.L.C.F.		1	2	2	5
B.P.G.		1	2	1	4
O.M.G.	3	6	6	3	18
Totals:-	(9)	(21)	(22)	(13)	(65)

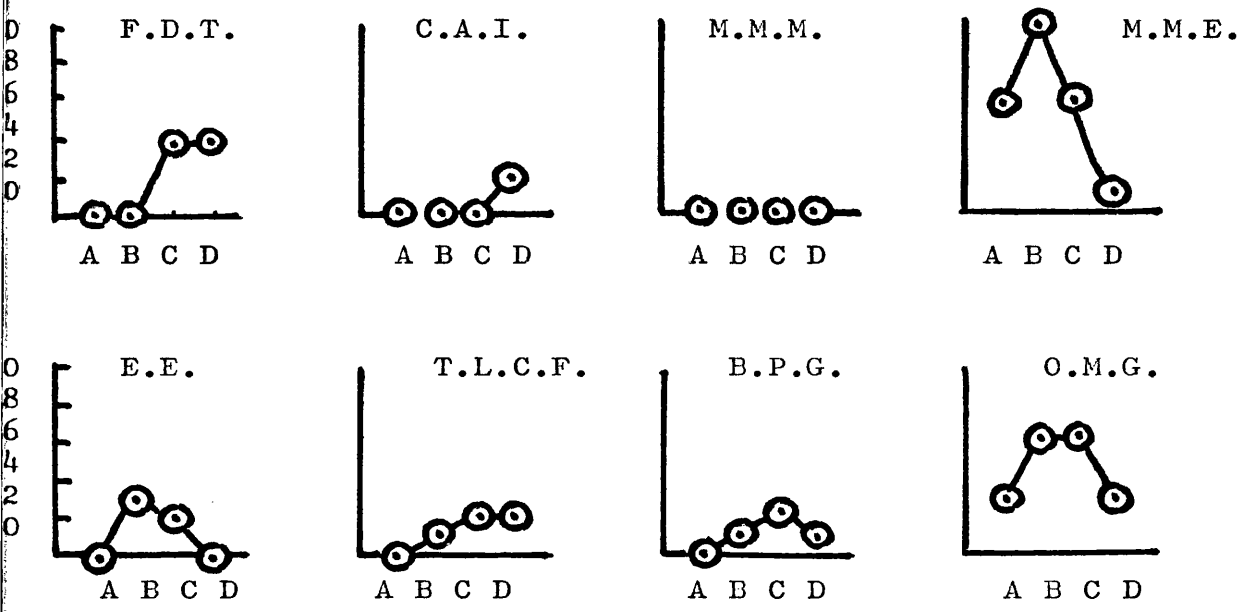
Source: Plymouth Survey Questionnaires; Questions 4, 7, 85, and 89.

Table 2.9 Parabolic Employee Group Distribution of Firms by Degree of Production Run "A", "B", "C" or "D". Test 6

Employee Group	Actual Sample Degree of Production Run				
	A	B	C	D	Totals
0-24	5	11	7	3	26
25-99	2	6	6	4	18
100-199	1	3	5	3	12
200+	1	1	4	3	9
Totals:-	(9)	(21)	(22)	(13)	(65)

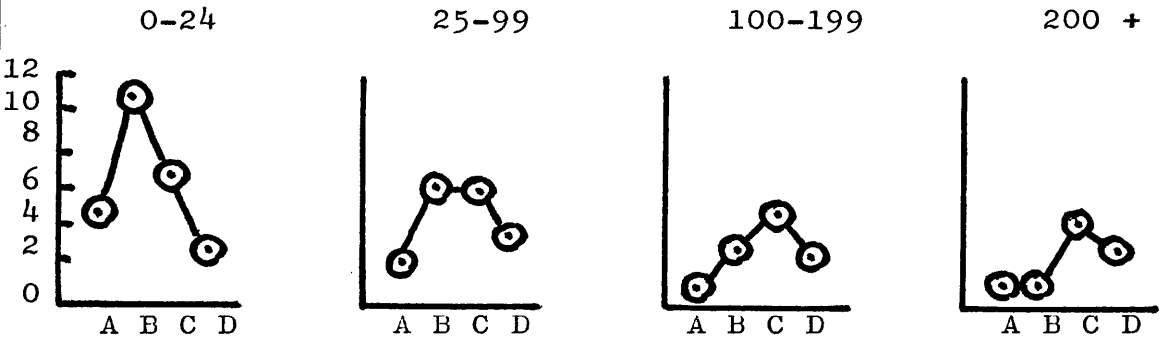
Source: Plymouth Survey Questionnaires; Questions 1, 14, 7, 85, and 89.

Fig. 2.4 Parabolic Industrial Group Distribution of Firms by Degree of Production Run. Test 5



Source: Plymouth Survey Questionnaires; Questions 4, 7, 85, and 89.

Fig. 2.5 Parabolic Employee Group Distribution of Firms by Degree of Production Run. Test 6.



Source: Plymouth Survey Questionnaires; Questions 1, 14, 7, 85, and 89.

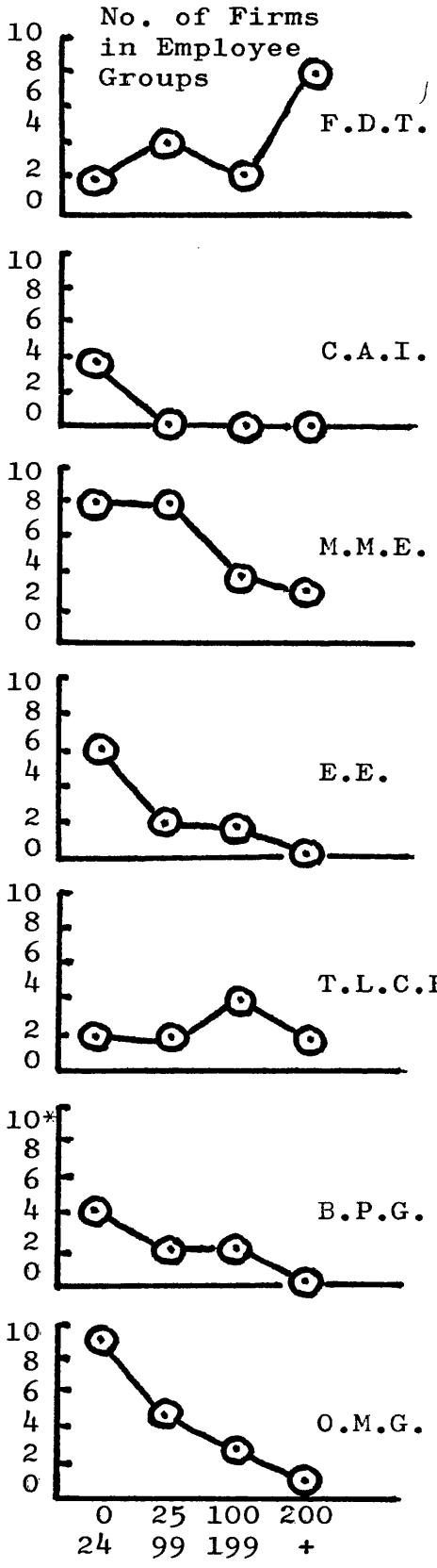


Fig. 2.6 Acceptable Employee Group Distribution in the Eight Industrial Groupings. Test 7.

Source: Plymouth Survey Questionnaires; Questions 1, 4, and 14.

Table 2.10 Acceptable Employee Group Distribution in the Eight S.I.C. Groups. Test 7.

S.I.C.	Actual Sample				
	0-24	25-99	100-199	200+	Totals
F.D.T.	1	2	1	4	8
C.A.I.	2				2
M.M.E.	8	8	4	3	23
E.E.	3	1	1		5
T.L.C.F.	1	1	2	1	5
B.P.G.	2	1	1		4
O.M.G.	9	5	3	1	18
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Questions 1, 4, and 14.

The ages of the firms showed a fairly wide spread (TEST 8). This was desirable since a sample of firms all incorporated after, say, 1945 might have given misleading results, e.g. as a consequence of regional aid policy since that date. As it was, some 51% only were formed after 1950. Similarly, if all firms had been formed within the past 5 years when conditions had been uncertain, then policy decisions could well have been influenced by this factor alone, e.g. firms deciding prematurely to leave the industry. On the other hand, older firms might regard a difficult period as a temporary problem only, which could be solved over the longer term. Thus, its policy decisions would tend to be rather less dramatic, and more representative of the industry generally.

Table 2.11 Dates of Formation - Plymouth Survey. Test 8.

Date Grouping	Numbers	%
Pre 1899	8	12
1900 - 1909	1	2
1910 - 1919	2	3
1920 - 1929	6	9
1930 - 1939	7	11
1940 - 1949	8	12
1950 - 1959	9	14
1960 - 1969	18	28
1970 -	6	9
Totals:-	65	100

Source: Plymouth Survey Questionnaires; Question 3.

Thus, the selection of the Plymouth Survey sample was fundamentally influenced by the methods employed by the Bolton Committee. The Plymouth Survey sample complied basically with eight tests of acceptability:-

TEST 1 The distribution of manufacturing industry firms in the Plymouth area.

TEST 2 The distribution of the Plymouth area labour force.

TEST 3 A parabolic total distribution of firms by degree of production run "A", "B", "C", and "D".

TEST 4 A hyperbolic total distribution of firms by 0-24; 25-99; 100-199; and 200+ employee groups.

TEST 5 A parabolic industrial group distribution of firms by degree of production run.

TEST 6 A parabolic employee group distribution of firms by degree of production run.

TEST 7 An acceptable employee group distribution of the eight standard industrial groupings, and

TEST 8 An acceptable age of firm distribution.

INTERVIEWING PROBLEMS IN THE PLYMOUTH SURVEY

It must be stated that several of the smaller firms found some of the questions rather searching (see Appendix II) and could not always give in-depth answers. Many firms gave information which they obviously believed to be correct, and this data had to be accepted as such. Documentary evidence was not always to hand. Firms just did not keep certain records or have documents available. And even if they were available, retention was not always permitted. But some material was collected, e.g. on investment appraisal methods adopted. As far as the answers to questions were concerned, it was usually possible to cross check most of the data either with other key perons, or against other answers. For example, some firms claimed that price and demand for the product were inversely related. But it was later revealed that if the firm raised or lowered its price by a marginal amount on routine production, demand would remain unchanged. But if price were raised or lowered by a significant amount, demand would be affected depending on the nature of the work undertaken, e.g. highly specialised work with a limited market tended to have a fairly inelastic demand schedule. Thus, although demand and price were inversely related, the demand curve had a vertical section at the relevant price and output, and few firms in the sample had appreciated this. This rather important finding is developed more fully in Chapter 7.

Similarly, answers to questions on investment decision making could be probed. Questions 44 and 50 asking which factors influenced the decision to invest produced a variety of answers, one of which was to enable the firm to expand its level and range of output. But whilst this could well be true for investment on routine

production, it certainly was not always the case on one-off jobs. Small firms, it appeared, frequently obtained an order first, and then looked around for suitable machinery to do the work.

Additionally, some firms said that they set price by using the cost plus percentage profit method as pioneered by Hall and Hitch (5). But if the percentage varied, and it was suspected that it might, then this was often a rough attempt to select a satisficing price. Cost plus was not really the firm's aim in the purest sense.

Again, firms claimed that their main investment problems stemmed directly from the unsatisfactory economic situation. But investment tended to be low even during growth period, e.g. 1972, because of firms' unwillingness to plan investment long term; a reluctance to seek management consultants' advice; a rejection of external funds even though likely to be profitable; a refusal to consider the advantages of discounted cash flow techniques, and so on.

Several companies believed they were flexible, but questions 87 and 96 showed that price fixing and output determination were decidedly rigid. If firms were pursuing optimum profit, i.e. answer 10, then this tended not to be borne out by other answers covering, for example, regional aid.

Thus, the questionnaire served the dual purpose of collecting information relevant to investment decision making and investment returns, and at the same time checking and stabilising conflicting evidence.

FIRMS IN THE PLYMOUTH SURVEY

After being subjected to the eight tests, the 65 firm

sample was considered to be both suitable and representative of the wider Plymouth area. Brief details of these firms are contained in Table 2.12 below.

Table 2.12 The Plymouth Survey Sample Firms

Code Number (P = Plymouth)	Firms	S.I.C.	Number of Employees as at 1975	Prod'n Run Category A, B, C, D,	Product (Main)
P1	Bowyers Ltd.	F.D.T.	486	C	Sausages
P2	Courage Western Ltd	F.D.T.	95	D	Brewing
P3	Drakes Sweets Ltd	F.D.T.	50	C	Sweets
P4	Farleys Infant Food Ltd	F.D.T.	600	D	Rusks
P5	E. Jackson & Co Ltd	F.D.T.	120	D	Pastilles
P6	Lloyd Maunder Ltd	F.D.T.	450	D	Meat
P7	Masons Table Water Ltd	F.D.T.	20	C	Minerals
P8	Spillers French Baking Ltd	F.D.T.	300	C	Bread
P9	Cornish Fish Fertilisers Ltd	C.A.I.	15	D	Fertiliser
P10	Croda Ltd	C.A.I.	12	D	Fats/Oils
P11	Bellows Valvair Ltd	M.M.E.	124	C	Valves
P12	R. Bibby (Engineers) Ltd	M.M.E.	18	C	Moulds
P13	Blight & White Ltd	M.M.E.	170	B	Steelwork
P14	Brown & Sharpe Ltd	M.M.E.	468	B	Lathes
P15	Continental Engravers Ltd	M.M.E.	14	B	Engraving
P16	Delmain Precision Engineering Ltd	M.M.E.	10	C	Press Tools
P17	Engineering Developments Ltd	M.M.E.	90	C	Packaging Machines
P18	Terry Erskine Yachts	M.M.E.	12	A	Yachts
P19	Honor Marine Ltd	M.M.E.	60	B	Longboats
P20	Marine Products Ltd	M.M.E.	120	B	Boats
P21	Metalock Ltd	M.M.E.	1	A	Block Repairs
P22	Mitchell Marine Ltd	M.M.E.	21	B	Boats
P23	Northfield Foundry Ltd	M.M.E.	50	B	Castings

Table 2.12 (Continued)

Code Number (P = Plymouth)	FIRMS	S.I.C.	Number of Employees as at 1975	Prod'n Run Category A, B, C, D,	Product (Main)
P24	Pankhurst Engineering Co Ltd	M.M.E.	200	C	Tools
P25	Paper Converting Machines Ltd	M.M.E.	385	A	Machinery
P26	Philip & Son Ltd	M.M.E.	70	A	Trawlers
P27	Rosemount Engineering Ltd	M.M.E.	40	D	Thermowells
P28	Skaigh Evy Ltd	M.M.E.	4	B	Castings
P29	T.T.B. Fabrication Ltd	M.M.E.	56	C	Disposal Units
P30	Watermota Ltd	M.M.E.	30	B	Engines
P31	A. E. Watson Ltd	M.M.E.	50	B	Steelwork
P32	Westbrick Engineering Ltd	M.M.E.	140	A	Machines
P33	Yealm Boat Co Ltd	M.M.E.	3	A	Boats
P34	Gardiner Refrigeration Ltd	E.E.	20	B	Cold Rooms
P35	Globelight Industries Ltd	E.E.	20	B	Motors
P36	Hatfield Instruments Ltd	E.E.	122	C	Communication Equipment
P37	Radio Intercom Ltd	E.E.	27	C	Paging
P38	Western Electrical Controls Ltd	E.E.	8	B	Panels
P39	Clarks Ltd	T.L.C.F.	800	D	Footwear
P40	Jaeger Ltd	T.L.C.F	158	B	Clothing
P41	Ladybird Ltd	T.L.C.F	150	C	Clothing
P42	E. Owen Ltd	T.L.C.F	26	D	Uniforms
P43	Seal Marine Ltd	T.L.C.F	13	C	Wet Suits
P44	Clark Eaton Ltd	B.P.G.	45	D	Glass
P45	Dartmouth Pottery Ltd	B.P.G.	23	C	Pottery
P46	Devon Leathercrafts Ltd	B.P.G.	140	C	Pottery
P47	Lotus Pottery	B.P.G.	13	B	Pottery
P48	E. Bond & Sons Ltd	O.M.G.	25	C	Furniture
P49	Blinds-Awnings Ltd	O.M.G.	19	B	Blinds
P50	W. G. Boon & Sons	O.M.G.	44	C	Boxes
P51	Stanley Cox Ltd	O.M.G.	3	B	Transfers
P52	F. E. Harris Ltd	O.M.G.	22	D	Coffins
P53	Raymond Hicks Ltd	O.M.G.	20	C	Furniture

Table 2.12 (Continued)

Code Number (P = Plymouth)	FIRMS	S.I.C.	Number of Employees as at 1975	Prod'n Run Category A, B, C, D.	Product (Main)
P54	Hitchings & Mason Ltd	O.M.G.	24	B	Printing
P55	Issac & Uren Ltd	O.M.G.	25	A	Vehicles
P56	Latimer Trend Co Ltd	O.M.G.	50	B	Printing
P57	Leaf Diamond Industries Ltd	O.M.G.	2	A	Diamond Wheels
P58	Pritchard Plastics Ltd	O.M.G.	17	A	Mouldings
P59	Ready Mixed Concrete Ltd	O.M.G.	175	D	Concrete
P60	Reeves Ltd	O.M.G.	106	C	Timber
P61	S.T.D. Joinery Ltd	O.M.G.	24	C	Tools
P62	Sperry Remmington Rand Ltd	O.M.G.	400	C	Systems
P63	H. Tempest Ltd	O.M.G.	170	D	Films
P64	Tinker Marine Ltd	O.M.G.	3	B	Inflatable Boats
P65	R. B. Tope Ltd	O.M.G.	30	B	Tents

Source: Plymouth Survey Questionnaires; Questions 2, 4, 1, 14, 7, 85, 89, 5.

FIRMS IN THE GREATER MANCHESTER STUDY (3)

Since occasional reference will be made to the 1971 Greater Manchester Study (3), a complete list of firms in that project might be helpful. It will be noted that degrees of production run were not included in this work.

Table 2.13 The Greater Manchester Study Sample Firms

Code Number (GM = Greater Manchester)	FIRMS	S.I.C.	Number of Employees as at 1971	Product (Main)
GM1	Lonsdales Bakery Ltd	F.D.T.	200	Bread
GM2	Alliance Dye & Chemical Co Ltd	C.A.I.	60	Dyes
GM3	James Halstead Ltd	C.A.I.	200	Plastics
GM4	Rubber Regenerating Co Ltd	C.A.I.	190	Rubbers
GM5	Taylors Cellulose Lacquer Co Ltd	C.A.I.	25	Paints
GM6	Varnish Industries Ltd	C.A.I.	24	Resins
GM7	Wareing Bros Ltd	C.A.I.	40	Paints
GM8	Able Bodywork Ltd	M.M.E.	45	Bodyworks
GM9	British Turntable Co Ltd	M.M.E.	13	Display Engineering
GM10	Commercial Spray Finishers Ltd	M.M.E.	8	Enamellers
GM11	England Group	M.M.E.	140	Tubing
GM12	Francis Searchlights Ltd	M.M.E.	54	Searchlights
GM13	Halliwell Engineering Ltd	M.M.E.	13	Machinery
GM14	Richard Hough Ltd	M.M.E.	95	Calender Bowls
GM15	John Hunt Ltd	M.M.E.	50	Bakery Machines
GM16	Kemax Tools Ltd	M.M.E.	25	Jigs and Gauges
GM17	J. W. Kirkman Ltd	M.M.E.	45	Brasswork
GM18	Lever Street Metal Co Ltd	M.M.E.	14	Sheet Metal
GM19	Manchester Dry Docks Ltd	M.M.E.	175	Marine Work
GM20	F. N. Morris Engineering Ltd	M.M.E.	5	General Engineers
GM21	Pressrig Engineering Co Ltd	M.M.E.	2	Hydraulics
GM22	Ryders Ltd	M.M.E.	67	Heating Equipment
GM23	Seddons Ltd	M.M.E.	150	Construction
GM24	Thynne Engineers Ltd	M.M.E.	45	Metal Fabrications

Table 2.13 (Continued)

Code Number (GM = Greater Manchester)	FIRMS	S.I.C.	Number of Employees as at 1971	Product (Main)
GM25	B. Jaques & Sons Ltd	E.E.	75	Insulations
GM26	Affraform Ltd	T.L.C.F.	15	Foams
GM27	Ainsworth Down Quilt Ltd	T.L.C.F.	42	Quilts
GM28	H. Coates & Sons Ltd	T.L.C.F.	40	Dresses
GM29	F. & H. Footwear Ltd	T.L.C.F.	69	Footwear
GM30	Gayonnes Ltd	T.L.C.F.	24	Fabrics
GM31	Lantor Ltd	T.L.C.F.	200	Non-woven Fabrics
GM32	Joseph Maude & Co Ltd	T.L.C.F	125	Rayon Processing
GM33	Blackshaw Sykes & Morris Ltd	O.M.G.	30	Printing
GM34	Cygnet Joinery Co Ltd	O.M.G.	200	Furniture
GM35	Wm. Dearlove & Son Ltd	O.M.G.	7	Basketwork
GM36	Greaves & Thomas Ltd	O.M.G.	130	Furniture
GM37	Kenco Chemicals Ltd	O.M.G.	50	Firelighters
GM38	Thos. Moscrop & Co Ltd	O.M.G.	18	Oil Blending
GM39	McEngodale Printers Ltd	O.M.G.	80	Printing
GM40	Seel House Press Ltd	O.M.G.	138	Printing

Source: The 1971 Greater Manchester Study Questionnaires; Questions 2, 5, and 6.

It was considered at the time of the study that the above areas of activity were suitably spread and representative for the sample to be effective. Since the majority of small firms in the Greater Manchester area tended to be in the fields of Mechanical Engineering, Textiles, and Chemicals and Allied Industries, these three S.I.C. groups figured prominently in the sample.

KEY PERSONNEL IN THE PLYMOUTH SURVEY

It was assumed at the outset that in most small firms (and perhaps even in some large ones) that the major

decisions would be taken, or at least influenced, by one dominant key person. Inevitably, co-directors and executives, e.g. accountants, would be consulted, but the key person would, nevertheless, dominate decision making. Where possible, this individual was the officer who supplied the required data for the Plymouth Survey.

It was soon realised that although these key personnel appeared to be adequate for their decision making roles (bearing in mind the findings of the 1971 Greater Manchester Study and reported in Chapter 1), very few were highly qualified academically. No specific data were collected on this topic but the Bolton Report (1) did provide some figures from that particular research.

Table 2.14 Key Personnel Qualifications. Bolton Report 1971

No Higher Education	Degree	Accounting Qualifications	Professional and Misc.	Total
71%	10%	8%	11%	100%

Source: Small Firms, Report of the Committee of Inquiry on Small Firms, Nov. 1971, Cmnd. 4811, p 9, Table 2.

Similarly, the Bolton Report (1) also produced data on the average ages of the chief executives in the small firms under review by the committee.

Table 2.15 Average Ages of Chief Executives. Bolton Report 1971

Size of Firm	Average Age of Chief Executive
0 - 24	52
25 - 99	55
100 - 199	58

Source: Bolton Report, Table 2, VI, p 8.

There was no way of verifying these statistics in the Plymouth Survey but one gained the impression that in the smaller private companies promotion to higher management depended to a large extent on family ties, and possibly less on merit. Thus, the key person was likely to be older than key persons in the larger units where merit promotion was probably more prominent. There were, for example, no key persons in their 20's in the sample firms.

To what extent the quality of decision making was affected by qualification, age, etc., was difficult to assess. No doubt many very successful small firms are managed by persons with little or no higher education. On the other hand, there must be some unsuccessful firms run by well qualified people. But the point at issue here was really whether well qualified persons were able to adopt specific policies of optimisation more expertly than less well qualified managers or not. Regretfully, no conclusions could be reached. However, although executives claimed that profit was of great importance generally, there was no evidence here to suggest that they had the tools or the expertise to pursue policies other than the aspiration to a satisfactory level of return. It was notable that this early impression did link both with the writer's experience in a small firm, and with the preliminary findings in the Greater Manchester Study (3).

STATUS OF THE PLYMOUTH FIRMS

It was considered that firms owned by a parent might develop different decision patterns from those companies who were independent. Out of the total population of

65 firms, 35 were independent, and 3 were parents of others. A higher proportion of independence would have been preferable but basically all subsidiaries were in a position to implement their own investment decisions within tolerable limits. And this included branches in the Plymouth area of the larger firms. If this was not the case then such a unit was eliminated from the sample.

Table 2.16 Plymouth Survey Parents, Subsidiaries, and Independents

Status	Numbers	%
Parent	3	5
Subsidiary	27	42
Independent	35	53
Totals:-	65	100

Source: Plymouth Survey Questionnaires; Question 3.

Table 2.17 Greater Manchester Study Parents, Subsidiaries and Independents

Status	Numbers	%
Parent	1	2
Subsidiary	16	40
Independent	23	58
Totals:-	40	100

Source: Greater Manchester Study Questionnaires; Question 4.

As far as the type of firm was concerned, out of the 65, 63 were limited companies, and 2 were sole proprietorships, i.e. one in pottery, and the other in boat building.

MAIN AND DIVERSIFIED PRODUCTS

Firms had concentrated on their main products over the

years for various reasons, and a selection of the responses are given below.

"Traditional service offered. Food industry relatively safe. No diversification needed". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 6).

"Growing market potential, then stabilised. Negligible market seeking currently". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q6)

"Long term development and expansion of market since 1920's. Trade depends on industrial trends. Not policy to pursue new markets". (P13; 170; B: MME; Structural Steelwork; PSQ,Q6).

"Previously was executive in large firm. Bought present firm eight years ago. Was new line then. Currently no diversification, although possible, and could be profitable". (P15; 14; B; MME; Engraving; PSQ,Q6).

"Owner previously designed current boat for old company which became bankrupt. Then formed this firm four years ago. Could diversify by producing 42' X 12' boat at a price of £30,000. This would sell but currently no capacity to produce it, and no plans to obtain new premises". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q6).

"Some diversification into hulls for builders to spread the risks here, e.g. on trade cycle downturn". (P19; 60; B; MME; Longboats; PSQ,Q6).

"Luxury market always stable irrespective of economic conditions. Diversification thus limited". (P20; 120; B: MME; Boats; PSQ,Q6).

"Demand has risen by 15% p.a. since 1950. Some excess capacity exists, e.g. expertise tends not to be fully used. Considering possible diversification to employ this expertise". (P21; 1; A; MME; Casting Repairs; PSQ,Q6).

"Traditional product since first U.S.A. company in 1919, and the emergence of the folding paper revolution in the 1920's, e.g. paper napkins. Not specific policy to look for profitable markets other than those engaged in". (P25; 385; A; MME; Paper Converting Machinery; PSQ,Q6).

"Traditional work since 1850's. Not considered the alternatives". (P26; 70; A; MME; Trawler Repairs; PSQ,Q6).

"Conversion market more potential than mere repairs. Not seeking further new outlets currently". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q6).

"Owners interested in boats as a hobby. Could make more profit by advertising and looking around for custom, but do not actually do this". (P33; 3; A; MME; Boats; PSQ,Q6).

"Opportunity taken when air-conditioning expanded but no plans for subsidiary products other than general servicing". (P34; 20; B; EE; Cold Rooms; PSQ,Q6).

"A traditional product with no diversification contemplated". (P39; 800; D; TLCF; Shoes; PSQ,Q6).

"Government contracts are the foundation of our existence. Diversification currently unnecessary". (P42; 26; D; TLCF; Military Uniforms; PSQ,Q6).

"Traditional product. No market seeking despite notorious seasonal effects". (P45; 23; C; BPG; Pottery; PSQ,Q6).

"Increased market demand for blinds over recent past. Diversified into double glazing for same reason. No further market seeking planned". (P49; 19; B; OMG; Venetian Blinds; PSQ,Q6).

"Demand for temporary containers since 1830. Although diversification into plastic has great possibilities, no move has been made in this direction to date". (P50; 44; C; OMG; Cardboard Boxes; PSQ,Q6).

"Local demand for our work since 1947, and owners' possession of the required expertise. Could move into new fields, e.g. nationally, but tend not to do this, e.g. no advertising undertaken". (P54; 24; B; OMG; Printing; PSQ,Q6).

"Owner expertise and known demand for specialised work rather than mass production transfers. Are operating in a particular part of the ceramics market and the objective is to maximise our market share by (i) selling more to present customers, (ii) selling to operators in field who do not buy from us, and (iii) selling to operators not in field but would benefit from contact with us. Thus, prepared to market seek". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q6).

"Vehicle section of firm always regarded as the dominant area. Not considered changing this, e.g. could move more into general engineering field, but not done this depite profit potential". (P55; 25; A; OMG; Vehicles; PSQ,Q6).

"Plastics growth industry. Difficult to diversify, and thus firm has no market seeking policy. No reasons can be offered for this". (P58; 17; A; OMG; Plastics; PSQ,Q6).

"Steady growth in demand since 1930's. Currently considering moving into stock production, e.g. the do-it-yourself trade rather than traditional heavy area". (P60; 106; C; OMG; Building Materials; PSQ,Q6).

"Shortly to move from business systems into marine gyros. The former market is too variable. This move was not inspired by strategy; current events dictated the decision". (P62; 400; C; OMG; Business Systems; PSQ,Q6).

"Traditional local service. Some diversification into rope production and mothballing of ships in local dockyard. Further subsidiary activity possible, e.g. winter work, and profitable, but no imminent plans in this direction". (P65; 30; B; OMG; Tents; PSQ,Q6).

Tradition, experience in that particular line, growing market trends, to serve some local demand, were clearly the principal explanations given. Only one firm (P30) had actually changed its main activity from Ford engine repairs to Ford engine diesel conversions because the latter market offered more potential. Hardly any firms had even considered movement into new fields, but 24 out of the 65 had indulged in some form of diversification. However, in 14 of these 24, the subsidiary product was merely an extension of the main activity. Only 10 firms, i.e. 15% of the population, could make the claim of acceptable diversification, albeit of varying strengths. Table 2.18 refers.

Table 2.18 Main and Diversified Products. Plymouth Survey

Code	Emp	Cat	S.I.C	Main Activity	Diversified Activity
P2	95	D	FDT	Brewing	Marketing
P13	170	B	MME	Steelwork	Cattle Grids
P30	30	B	MME	Ford Petrol Engine Conversions	Stern Gear
P33	3	A	MME	Boats	"Boatique"
P34	20	B	EE	Cold Rooms	Servicing
P42	26	D	TLCF	Uniforms	Military Badges
P43	13	C	TLCF	Wet Suits	Respirators
P49	19	B	OMG	Venetian Blinds	Double Glazing
P56	50	B	OMG	Books/Printing	Stage Scripts
P65	30	B	OMG	Tents	Ropes

Source: Plymouth Survey Questionnaires; Question 5.

The inference drawn from these preliminary results was that potential returns were not necessarily being tapped. Profit optimisation would require some flexibility of product and market area. There was little evidence of this. Incidentally, if "diversification" was practised or contemplated, it did tend to be in the smaller firms, i.e. 0-24 and 25-99 employee groups. Could this lack of diversification be explained by the various expertise limitations of small firms as indicated by Kaplan (6) and Alexander and Woodruff (7)? Actually, entering into new markets was just not popular, being regarded as unnecessarily risky rather than risk-spreading. However, in some instances, such action could have been no more risky than the activity currently engaged in, and producing disappointing results.

PRODUCTION RUN PROBLEMS IN THE PLYMOUTH SURVEY

As previously indicated, firms were allocated a category

"A", "B", "C", or "D", according to the degree of production run possible on their main activity. Further examples of this selection process are contained in Table 2.19 below.

Table 2.19 Examples of Categories of Firms by Degree of Production Run. Plymouth Survey

Cat.	Description	Examples	Type of Run
"A"	Specialiser	One-off boat design and production (P18)	Negligible
		Restoration of cracked cylinder blocks (P21)	
		Custom built paper converting machines (P25)	
		Diamond Wheels (P57)	
"B"	Differentiator	Aluminium castings (P23)	Restricted
		Automatic machine tools (P14)	
		Air conditioning units (P34)	
		Books, booklets, stage scripts (P56)	
"C"	Standardiser	Valves and cylinders (P11)	Extended
		Sheet metal (P16)	
		Pottery (P46)	
		Joinery tools (P61)	
"D"	Repeater	Food (P4)	Continuous
		Footwear (P39)	

Table 2.19 (Continued)

Cat.	Description	Examples	Type of Run
"D"	Repeater	Military Uniforms (P42)	Continuous
		Ready mixed concrete (P59)	

Source: Plymouth Survey Questionnaires; Questions 7, 85, and 86.

Some firms had experienced problems as a result of being engaged in their particular category of production, and the following are some examples of these.

"Inverse relationship between economic climate and sales. Extended production runs can result in over-production". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 9).

"Miscellaneous lines demanded create production scheduling problems". (P3; 50; C; FDT; Confectionery; PSQ,Q9).

"Less chance of innovation if continuous production runs operated, and thus costly". (P4; 600; D; FDT; PSQ,Q9).

"If small batches accepted then technical problems of actually completing the job, and cutting corners for profit, arise". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q9).

"Labour monotony problems exist in this trade". (P6; 450; D; FDT; Meat; PSQ,Q9).

"Can lose sight of alternatives available, e.g. diversification". (P10; 12; D; CAI; Pharmaceuticals; PSQ,Q9).

"Costs would be lower if longer production runs were possible". (P12; 18; C; MME; Plastic Injection Moulds; PSQ,Q9).

"Would prefer more repetition for reduced average costs of production". (P13; 170; B; MME; Structural Steelwork; PSQ,Q9).

"Trade cycling disturbs batch flow scheduling". (P14; 468; B; MME; Automated Machine Tools; PSQ,Q9).

"Very high overheads are not sufficiently spread on one-off production". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q9).

"Considerable excess capacity on one-off production exists". (P21; 1; A; MME; Repair of Cracked Cylinder Blocks; PSQ,Q9).

"Design capability to meet requirements; raw material availability, e.g. gearbox shortages; and full labour utilisation, are all problems on specialist production". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q9).

"One design and continuous production runs would be preferred". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q9).

"One-offs and small batches are not inter-changeable and are thus costly". (P31; 50; B; MME; Steelwork; PSQ,Q9).

"Longer runs are preferred (although designs do sell) to effect easier production scheduling and lower costs of production". (P37; 27; C; EE; Paging Systems; PSQ,Q9).

"Retaining the desired quality on continuous production runs is a major problem". (P39; 800; D; TLCF; Footwear; PSQ,Q9).

"Reconciling 50 to 60 styles and the re-training necessary with acceptable costs of production". (P40; 158; B; TLCF; Clothing; PSQ,Q9).

"Withdrawal of government contracts would disrupt continuous production gearing of plant". (P42; 26; D; TLCF; Military Uniforms; PSQ,Q9).

"A specific level of business is needed to pay our way. Continuous batches achieve this, but one-offs are more profitable". (P44; 45; D; BPG; Glass; PSQ,Q9).

"Mass production of pottery is cheaper than extended batches, but our market would not permit this change-over". (P46; 140; C; BPG; Glass/Pottery; PSQ,Q9).

"Conflict between 'lines' and mass production economies". (P49; 19; B; OMG; Woodware Products; PSQ,Q9).

"Product cannot be divorced from the service. Thus, very short runs tend not to utilise plant capacity fully". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q9).

"Possibility of production on mass lines forcing us out of business. Our slightly more individual styles may not be sufficient to survive". (P53; 20; C; OMG; Furniture; PSQ,Q9).

"Almost permanent excess capacity of 25%. Longer runs would help to solve this". (P54; 24; B; OMG; Printing; PSQ,Q9).

"Extended production runs have been over-estimated. Now a new field of operation is needed. Labour had been laid off. New intake to be re-trained at some expense". (P62; 400; C; OMG; Business Systems; PSQ,Q9).

"Restricted batch production under-utilises floor space capacity". (P64; 3; B; OMG; Inflatable Boats; PSQ, Q9).

An interesting feature of the above was that firms in categories "A" and "B" envied the longer production runs of categories "C" and "D". On the other hand, firms in categories "C" and "D" pointed out that economies of scale could be counteracted by lack of innovation and labour mobility. Labour monotony was also an issue. In any event, it seemed likely that firms' categories of production run involved them in some expense and inconvenience which could possibly have been eased by the pursuance of some diversification. However, as we have seen, this policy was not one which was vigorously sought after. In the light of the foregoing, could firms be optimising their returns?

MAIN AND SUBSIDIARY GOALS OF THE PLYMOUTH SURVEY FIRMS

In order to probe more deeply whether firms were optim-

ising or not, interviewees were asked to specify the company's main and subsidiary goals. It emerged that the principal policy of 38% of the firms was "satisfactory profit", and this claim was spread fairly evenly among all four employee groups. Sales expansion was not well represented. Perhaps a notable result was the restrained desire to develop new products, and in fact, only one firm (P10) actually stated this, and even then as a subsidiary policy only. The Bolton Committee (1) demonstrated the innovative role of small firms in a favourable light, but this must not be confused with the research and developments of products in different lines from the main activity of the firms. And it will be recalled, of course, that diversification was, in any event, rather limited.

Table 2.20 Main Goals of Firms in the Plymouth Survey

Goals	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Satisfactory profit	9 (35%)	7 (38%)	4 (34%)	4 (45%)	24 (38%)
"Maximum" profit	2 (7%)	2 (11%)			4 (6%)
Long term profit	3 (12%)		1 (8%)	1 (11%)	5 (8%)
Short run profit	1 (4%)	2 (11%)			3 (6%)
Sales "maximisation"	2 (7%)	3 (16%)	3 (25%)	1 (11%)	9 (15%)
Sales with low profit margin	1 (4%)				1 (1%)
Short run break even	1 (4%)		1 (8%)		2 (3%)
Price stability	1 (4%)				1 (1%)
Eliminate excess capacity	1 (4%)				1 (1%)
General expansion	2 (7%)		2 (17%)		4 (6%)

Table 2.20 (Continued)

Goals	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Quality product	1 (4%)	1 (6%)		3 (33%)	5 (8%)
Competitive prices	1 (4%)	1 (6%)			2 (3%)
Consolidation	1 (4%)				1 (1%)
Fair prices charged		1 (6%)			1 (1%)
Non-use of man made fibres			1 (8%)		1 (1%)
Local service		1 (6%)			1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 10.

Subsidiary policies tended to be rather more individual, for example, safety, efficient distribution, prompt payments for supplies, product selectivity for profit, local service, etc., but three clear motives predominated, namely survival (spread fairly evenly among the four employee groups), satisfactory profit (again), and cost minimisation. It was true, incidentally, that several firms had offered more than one main and subsidiary goal, but in each case, the principal motive was selected.

Table 2.21 Subsidiary Goals of Firms in the Plymouth Survey

Goal	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Survival	5 (19%)	3 (15%)	3 (25%)	2 (23%)	13 (21%)
Satisfactory profit	5 (19%)	1 (6%)	4 (34%)	1 (11%)	11 (18%)
Cost minimisation	2 (8%)	5 (27%)	2 (17%)		9 (15%)

Table 2.21 (Continued)

Goals	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Safety and hygene				2 (22%)	2 (4%)
Local service		1 (6%)			1 (1%)
Competitive prices		1 (6%)			1 (1%)
Output "max-imisation"				1 (11%)	1 (1%)
Efficient distrib-ution				1 (11%)	1 (1%)
Quality product	4 (15%)	1 (6%)			5 (9%)
Development of new products	1 (4%)				1 (1%)
5% minimum on sales			1 (8%)		1 (1%)
Flexible policies				1 (11%)	1 (1%)
Efficient use of labour	1 (4%)				1 (1%)
Prompt pay-ment of supplies	1 (4%)				1 (1%)
General ex-pansion	4 (15%)	2 (11%)			6 (10%)
Consolidation of firm		2 (11%)			2 (4%)
Sales expans-ion	2 (8%)				2 (4%)
No mass prod-uction			1 (8%)		1 (1%)
Product selectivity			1 (8%)		1 (1%)
Product res-earch and development	1 (4%)				1 (1%)
Ploughback policy		1 (6%)			1 (1%)
Efficient plant utilisation				1 (11%)	1 (1%)
Service		1 (6%)			1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 11.

Key persons gave specific reasons for adopting their policies. Several claimed that profit (satisfactory or otherwise defined), was the only goal for small firms in the light of 1975 economic conditions. But in the main, the policy tended to be the result of historical or traditional decision making. Once a firm had selected a goal, this would be retained, and only amended when events dictated. For example, some firms (P5; P11; P38; P43; P47; P61; P64; and GM8), had to adopt profit priority policies as a result of their current poor results. Flexibility of policy was not obvious. If, for example, an arbitrary 22% return on capital (P39) had been considered successful over the years, there appeared to be little chance that the policy would be changed. From all this, two points seemed clear; (i) it was possible that a flexible policy could have increased profit since if profit was not increased, then the policy could have been changed, and (ii) firms, in the main, adopted rather rigid policies, and retained them.

CONCEPTIONS OF SUCCESS

To what extent had these policies been successful? The following is a selection of responses indicating degrees of success rather than relative failure. The picture is thus conservatively stated.

"The firm is nationally regarded and is profitable. But profit has probably been below optimum over the years". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 12).

"Continued existence since 1850 despite trade's inverse relationship with the economic climate". (P2; 95; D; FDT; Brewing; PSQ,Q12).

"Success is not necessarily linked with profit but the elimination of working capital has produced a rate of return of 66%". (P3; 50; C; FDT; Confectionery; PSQ,Q12). N.B. Companies House records not available to check this figure.

"Firm was sufficiently successful to be taken over although large group has meant some loss of identity for the unit". (P4; 600; D; FDT; Food; PSQ,Q12).

"Survived the original 12 similar firms in the Plymouth area mainly be employing price stability as a policy". (P7; 20; C; FDT; Minerals; PSQ,Q12).

"Gained reputation for quality product". (P9; 15; D; CAI; Fertilisers; PSQ,Q12).

"Continued product development". (P10; 12; D; CAI; Pharmaceuticals; PSQ,Q12).

"Demand has repeated for several years". (P12; 18; C; MME; Injection Moulds; PSQ,Q12).

"Survival to date". (P13; 170; B; MME; Steelwork; PSQ,Q12).

"Survived in difficult market". (P14; 468; B; MME; Machine Tools; PSQ,Q12).

"Eight years ago purchased this firm including a £25,000 overdraft. By 1974 the overdraft had been cleared during difficult conditions". (P15; 14; B; MME; Industrial Engravings; PSQ,Q12).

"Expansion over 10 years with customers retained. Only one price query in that time". (P16; 10; C; MME; Press Tools; PSQ,Q12).

"Survived four years of high taxation, inflation, 3 day week, etc. No regional aid available". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q12).

"Sales have risen from nil to £1.6m in 10 years". (P20; 120; B; MME; Boats; PSQ,Q12).

"Have been instructing the Americans in the metalock techniques. Repair defined as temporary but lasts 25 years". (P21; 1; A; MME; Casting Repairs; PSQ,Q12).

"Impressive growth record since 1964 in face of economic difficulties. Currently hold 80% of the U.K. market. Factory also serves Europe. Main growth area potential could be the Middle East, but the future is uncertain". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q12).

"Independence retained". (P31; 50; MME; B; Steelwork; PSQ,Q12).

"Steady growth of sales and reputation". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q12).

"Independence". (P37; 27; C; EE; Location Systems; PSQ,Q12).

"Survived 10 years of crises, e.g. credit squeezes, high taxation, inflation, regionalism, etc". (P38; 8; B; EE; Control Panels; PSQ,Q12).

"Internationally known and successful company". (P39; 800; D; TLCF; Footwear; PSQ,Q12).

"Reputation for quality product, i.e. known rejection of man-made fibres and no mass produced items". (P40; 158; B; TLCF; Clothing; PSQ,Q12).

"Sustained profit, except 1974, in highly competitive market". (P41; 150; C; TLCF; Clothing; PSQ,Q12).

"Survival during periods of crisis, e.g. government decisions to cut armed forces strength from time to time". (P42; 26; D; TLCF; Military Uniforms; PSQ,Q12).

"Survival in industry where no large profits are made". (P44; 45; D; BPG; Glass; PSQ,Q12).

"Firm sufficiently established for take over bid to be made". (P49; 19; B; OMG; Blinds; PSQ,Q12).

"Survival since 1830. Some growth sustained. Known for good service". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q12).

"Relatively satisfactory performance since 1957 but not without investment and capacity problems". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q12).

"Successful independent operation since 1947 but never at full capacity". (P54; 24; B; OMG; Printing; PSQ,Q12).

"Well established reputable firm serving local area". (P55; 25; A; OMG; Vehicles; PSQ,Q12).

"Reasonable success but trade cycling always a hindrance". (P60; 106; C; OMG; Building Materials; PSQ,Q12).

"Survival to date despite falling demand, excess capacity, lack of labour, etc". (P61; 24; C; OMG; Joinery Equipment; PSQ,Q12).

"Several years of reasonable, if slow, progress". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q12).

Firms considered survival either as second to profitability in the hierarchy of the firm's objectives or as one of the foundations for profitability. It was possible that survival could have been the fundamental objective since it was the only true goal and all other objectives were means of achieving this. Perhaps a major reason for emphasising survival could be that for the majority of managers who made decisions that had a significant effect on the activities of the small firm, their status and standard of living depended to a considerable extent on whether the firm survived or not.

The Bolton Committee (1) found that the basic motivation of small firm owners was the need to attain and preserve independence. This desire for independence summarised a whole range of personal satisfactions provided by working for oneself. It took account of many important psychic returns which operating a small business provided, and which appeared to be much more powerful motivations than money or the possibility of large financial gains.

Z. Brierley, chairman of a small firm and member of the Smaller Firms Council of the C.B.I. Welsh Industrial Development Board has stated that he did not believe that small businesses were interested only in how

much money they could make. He was convinced that financial rewards were often secondary to the satisfaction and independence which was to be obtained from running one's own enterprise (8).

AREAS OF RESEARCH

Could the Plymouth Survey firms be profit maximising as claimed by Chamberlin (9), and Robinson (10)? Could firms be maximising revenue with a profit constraint as suggested by Baumol (11)? Did they attempt Papandreou's (12) utility maximisation? Did they pursue Ames's (13) output maximisation? The early impressions were that they were content with their own conceptions of satisfactory profit only. The signs were that the firms in question were probably satisficing in the Simon (14) tradition.

If this was the case, to what extent did this satisficing and survival approach determine investment strategy and investment performance? This issue is now examined in some detail. Chapters 3, 4, and 5, explore the strategy of investment decisions; the use of investment finance; and the rigour of investment appraisal respectively. Chapter 6 assesses the optimality of investment returns, and Chapters 7, and 8 probe the impact of pricing policies and output determination on investment performance. Chapter 9 is concerned with investment accounting relationships. Chapter 10 offers some conclusions.

SUMMARY

PLYMOUTH SURVEY SAMPLE FIRMS The selection of the Plym-

outh Survey sample was fundamentally influenced by the methods employed by the Bolton Committee (1), and complied basically with eight tests of acceptability.

THE QUESTIONNAIRE The questionnaire was devised to serve the dual purpose of collecting information, and at the same time, checking and stabilising conflicting evidence.

THE 1971 GREATER MANCHESTER STUDY (3) The 1975 Plymouth Survey was to be supplemented from time to time by the 1971 Greater Manchester Study where appropriate.

KEY PERSONNEL To what extent the quality of decision making was affected by academic qualifications, age, etc., was difficult to assess, but there was no apparent evidence to suggest that well qualified managers, as opposed to unqualified, had the extra expertise to pursue policies other than those of satisficing.

MAIN PRODUCTS The majority of firms claimed that they had concentrated on their main products over the years mainly for traditional rather than strategic reasons.

DIVERSIFICATION Diversification was not popular being regarded as risky rather than risk-spreading. If diversification was practised, it tended to be undertaken by the smaller firms.

PRODUCTION RUN PROBLEMS Firms in categories "A" and "B" envied the longer production runs of categories "C" and "D" who countered by pointing out that economies of scale could be synonymous with lack of innovation and labour monotony.

MAIN AND SUBSIDIARY GOALS Firms considered survival either second to satisfactory profit in the hierarchy of objectives, or as one of the foundations for profitability. It was possible that survival could have been the fundamental objective since many firms regarded this as a barometer of success. The signs were that the sample firms were probably satisficing in the Simon (14) tradition.

REFERENCES

(1) "Small Firms", Report of the Committee of Inquiry on Small Firms, Chairman J. E. Bolton, Nov. 1971, Cmnd. 4811, p xv.

(2) A. Hankinson, "The Investment Behaviour of the Smaller Manufacturing Business Unit in the Plymouth Area 1970-1975", (The Plymouth Survey), Ph.D. Thesis, Univ. of Bath, unpublished as at 1977.

(3) A. Hankinson, "Investment, Price, and Output Decision Making in the Small Firm", (incorporating The Greater Manchester Study), M.Phil. thesis, Southampton Univ. 1974, (unpublished as at 1977)

(4) M. Tamari, Committee of Inquiry on Small Firms Research Report No. 16, "A Postal Questionnaire Survey of Small Firms - An Analysis of Financial Data", 1971, H.M.S.O.

(5) R. L. Hall and C. T. Hitch, "Price Theory and Business Behaviour", Oxford Economic Papers, May 1939.

(6) A. D. H. Kaplan, "Small Business - Its Place and Problems", McGraw Hill, 1948.

(7) A. M. Woodruff and T. G. Alexander, "Success and Failure in Small Manufacturing - A Study of 20 Small Manufacturing Concerns", Pittsburgh U. P., 1958.

(8) Z. Brierley, Daily Telegraph, 15 Jan. 1974.

(9) E. H. Chamberlin, "The Theory of Monopolistic Competition", Harvard U. P., Cambridge, Mass., 1933.

(10) J. Robinson, "The Economics of Imperfect Competition", Macmillan, London, 1933.

(11) W. J. Baumol, "On a Theory of Oligopoly", Economica, 1958.

(12) A. Papandreou, "Some Basic Problems in the Theory of the Firm", in B. Haley (Ed) "A Survey of Contemporary Economics", Vol. II, Irwin, Homewood, Ill., 1952.

(13) E. Ames, "Soviet Economic Processes", Irwin, Homewood, Ill., 1965, reprinted in G. C. Archibald (Ed) "The Theory of the Firm", Penguin, Harmondsworth, 1971.

(14) H. A. Simon, "New Developments in the Theory of the Firm", and "Theories of Decision Making in Economics and Behavioural Science", American Economic Review, May 1962, and June 1959.

CHAPTER 3

INVESTMENT DECISION STRATEGY

CHAPTER 3
INVESTMENT DECISION STRATEGY

THE SMALL FIRM SYNDROME

Jon Stanworth and James Curran in their book "Management Motivation in the Smaller Business" (1) claimed that individuals setting themselves up in business were likely to be social misfits; owner managers went through a three stage evolution as their firms grew; and there was not likely to be a shortage of small businesses in the future.

These were just some of the findings of this piece of research into the owner-managed firm. They seemed to be of particular relevance when the decline in the numbers of small businesses could be accelerated by the 1975 economic situation. Curran and Stanworth's research was carried out over a period of three years and covered a sample of small firms in the printing and electronics industries.

Their first objective was to find out why people set themselves up in their own businesses. The authors believed that "something special" had to drive them to undertake that basically risky course. The research showed that the "something special" was a feeling by the potential owner that he did not fit into some aspect of the social environment. Apparently, this lack of fit could take a wide variety of forms ranging from the intellectually gifted shop floor worker to the individualist

stifled by the bureaucracy of big business.

The writers go on to claim that the owner-manager went through three phases of aims as his firm grew, namely: (i) the independence aim; (ii) the profitability aim; and (iii) the desire to be admired for managerial skill. There was no real way of comparing these findings with those of the Plymouth Survey except to stress that survival emerged as a fundamental goal whatever the phase the firm was at.

Stanworth and Curran argued that there was a strong correlation between size and unionisation, and that some small firms were so afraid of organised labour that they preferred not to grow. The authors claimed that unionisation was a natural development which if better understood would be less feared. In the Plymouth Survey there was some suspicion of a link between size and unionisation (see Plymouth Survey Questionnaires, question 13), but no company in the 65 firm sample felt that labour relations were anything other than good to excellent.

The book was optimistic on the future supply of entrepreneurs. Certainly the 1974-1975 disillusionment with bigness should support this. But from the Plymouth Survey the problem was whether or not economic growth would be sufficient to produce opportunities for investing in new businesses, and whether small firms themselves did sufficient to ease their investment problems, which could occasionally have been self-imposed.

OBJECTIVES OF CHAPTER 3

What were the firms' overall investment strategies? How had the decisions to adopt these strategies been reached? What were the firms' assessments of success of their

strategies? What were the main investment problems? Did investment uncertainty exist, and if so, why? To what extent did firms exercise short run investment flexibility? Were there any significant functional relationships between investment and other variables? Was investment mainly active or passive? Which factors were the most important indicators in forming general investment expectations for the future? And what exactly were the main investment determinants and influences? Chapter 3 attempts to answer these questionns.

INVESTMENT STRATEGIES

If the returns on investment were to be optimised, the application of a specific investment strategy would be necessary. Whilst piecemeal approaches to investment could possibly produce short run optimum profit, in the longer term this would be more unlikely. Profit optimality demands a conscious effort on the part of the decision maker, and this would require, among a whole range of techniques and goals, a well defined and implemented investment strategy. This important aspect was investigated in four sections: (i) an assessment od the amount of vertical and horizontal investment undertaken, i.e. investment for improvement or replacement; (ii) an analysis of the main investment strategies, if any; (iii) how the decision to adopt the various strategies had been reached; and (iv) to what extent these strategies had been successful as far as the firms themselves were concerned.

Table 3.1 Vertical and Horizontal Investment. Plymouth Survey

Type of Investment	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Vertical	2 (8%)	2 (11%)	1 (8%)	5 (55%)	10 (15%)
Horizontal	21 (81%)	13 (72%)	8 (67%)	3 (33%)	45 (70%)
Vertical & Horizontal	3 (11%)	3 (17%)	3 (25%)	1 (12%)	10 (15%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 39.

Although difficult to generalise, vertical investment can be taken to mean capital expenditure aimed at improvement rather than mere replacement, i.e. horizontal investment. Disappointingly, from the point of view of optimality of returns, the majority of the firms adopted the latter policy, and the smaller the firm the more prominent was this tendency. There was, however, a slight indication from the figures that the larger units were more inclined towards vertical investment than the smaller firms.

Table 3.2 Investment Strategies. Plymouth Survey.

Investment Strategy Based on:-	Employee Group				
	0-24	25-99	100-199	200+	Totals
Increased returns		1 (5%)		3 (34%)	4 (6%)
Increased sales	1 (4%)	1 (5%)	2 (16%)		4 (6%)
Repairs & maint'ce	2 (8%)	2 (12%)	1 (8%)	1 (11%)	6 (10%)
Necessity, e.g. obsolescence, i.e. nil strategy	14 (54%)	9 (53%)	3 (27%)	1 (11%)	27 (42%)
Expansion of plant			1 (8%)		1 (1%)

Table 3.2 (Continued)

Investment Strategy Based on:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Efficiency improvement	5 (18%)	1 (5%)	1 (8%)	2 (22%)	9 (15%)
Own funds available	1 (4%)				1 (1%)
Depreciation covering		1 (5%)		1 (11%)	2 (3%)
Slow consolidation	1 (4%)	1 (5%)	1 (8%)		3 (5%)
Ploughback policy		1 (5%)	2 (17%)		3 (5%)
Plant growth	1 (4%)			1 (11%)	2 (3%)
Make or buy decisions	1 (4%)				1 (1%)
Efficient labour usage		1 (5%)			1 (1%)
Fixed % invested per annum			1 (8%)		1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 39.

Some firms tended to confuse strategy with short run objectives, but nevertheless, a prominent facet of the data was the absence of strategies in 27 firms, i.e. 42% of the total. However, this lack of strategy tended to decrease with the size of firm. The strategy of "repairs and maintenance" was fairly evenly spread among the four employee groups. Piecemeal investment was popularly practised and even where vertical investment strategies were apparent, they had been imposed, in the main, by necessity, e.g. plant obsolescence. The following extracts expand these individual investment "strategies" rather more fully.

"Financial return a crucial factor short or long runs. But doubtful if maximum returns are consistently pursued. Also, investment undertaken to improve conditions for food production". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 39).

"Investment undertaken regardless of competition or likely demand, but simply for increased market share". (P2; 95; D; FDT; Brewing; PSQ,Q39).

"Provided that item is required, investment must make 25% rate of return. Also, objective of investment is to eliminate working capital". (P3; 50; C; FDT; Confectionery; PSQ,Q39).

"No specific strategy employed. Repairs and maintenance the main investments". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q39).

"Strategy of necessity. Always considering second hand replacement machinery". (P7; 20; C; FDT; Minerals; PSQ,Q39).

"Necessity determines investment". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q39).

"Investment undertaken to secure long run repeating orders". (P12; 18; C; MME; Injection Moulds; PSQ,Q39).

"Up to date equipment in terms of expansion and replacement is the basis of our investment strategy". (P13; 170; B; MME; Steelwork; PSQ,Q39).

"Investment to improve efficiency and meet possible increased work loads when cycle breaks". (P14; 468; B; MME; Machine Tools; PSQ,Q39).

"To cover depreciation is our main investment approach". (P15; 14; B; MME; Industrial Signs; PSQ,Q39).

"Investment only carried out if we can pay cash from our own funds". (P16; 10; C; MME; Press Tools; PSQ,Q39).

"No overall strategy except to cover depreciation". (P17; 90; C; MME; Packaging Machinery; PSQ,Q39).

"Slow consolidation policy adopted. Possible larger market available but prefer to keep investment to a minimum". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q39).

"No particular strategy. Investment proceeds if required". (P19; 60; B; MME; Boats; PSQ,Q39).

"Policy of ploughback". (P20; 120; B; MME; Luxury Boats; PSQ,Q39).

"No strategy practised, but interested in machinery which cut costs". (P23; 50; B; MME; Iron Castings; PSQ,Q39).

"Strategy of depreciation covering is adopted". (P24; 200; C; MME; Toolmaking; PSQ,Q39).

"Basic growth strategy adopted. Occasionally a strategy of necessity is employed, e.g. contract secured, then invest for machinery to do the work". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q39).

"No strategy. Investment on piecemeal basis". (P26; 70; A; MME; Trawler Repairs; PSQ,Q39).

"Strategy geared to market potential, but no market research undertaken". (P27; 40; D; MME; Thermowells; PSQ,Q39).

"No specific strategy. Investment basically horizontal, but should be vertical in view of product change over". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q39).

"Very little investment undertaken but sufficient to preserve production flow". (P33; 3; A; MME; Luxury Yachts; PSQ,Q39).

"Make or buy strategy. If units produced elsewhere are too expensive, we then consider capital investment to produce the items ourselves". (P34; 20; B; EE; Cold Rooms; PSQ,Q39).

"No strategy adopted. Piecemeal approach only". (P35; 20; B; EE; Electric Motors; PSQ,Q39).

"Strategy of establishing the firm in the first ten years. Then repair and maintenance approach adopted". (P36; 27; C; EE; Location Systems; PSQ,Q39).

"Combined strategies of investment for improved quality of the product, and depreciation covering". (P39; 800; D; TLCF; Footwear; PSQ,Q39).

"No strategy. Haphazard system of seeking out machinery to produce quality work at speed, and which cuts operator thinking time". (P40; 158; B; TLCF; Clothing; PSQ,Q39).

"Strategy of ploughback of set % per annum". (P41; 150; C; TLCF; Clothing; PSQ,Q39).

"Investment to use unskilled labour efficiently". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q39).

"Strategy of cut-back. Current losses inhibit investment despite a certain market potential". (P43; 13; C; TLCF; Wet Suits; PSQ,Q39).

"Replacement policy during consolidation. Eventually expansion could take place". (P44; 45; D; BPG; Glass; PSQ,Q39).

"Normally strategy of investment for sales expansion. Currently strategy of cut-back owing to present economic situation". (P46; 140; C; BPG; Pottery; PSQ,Q39).

"Strategy of cautious minimum investment". (P47; 13; B; BPG; Pottery; PSQ,Q39).

"Investment undertaken to cut general costs of production". (P48; 25; C; OMG; Furniture; PSQ,Q39).

"Strategy of increasing machine capacity". (P49; 19; B; OMG; Blinds; PSQ,Q39).

"No pre-planning. Question of what investment is needed". (P50; 44; C; OMG; Cardboard Boxes; PSQ,Q39).

"Investment for productivity and replacement". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q39).

"Replace as required strategy employed". (P54; 24; B; OMG; Printing; PSQ,Q39).

"Ploughback strategy". (P55; 25; A; OMG; Vehicle Repairs and Production Parts; PSQ,Q39).

"Forced vertical investment recently. Modernisation occurred because plant became obsolete". (P56; 50; B; OMG; Printing; PSQ,Q39).

"Strategy of piecemeal investment". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q39).

"Standard % spent each year on investment. Major investment influenced by economic climate and building industry trade cycle". (P60; 106; C; OMG; Building Materials; PSQ,Q39).

"Basic investment only". (P61; 124; C; OMG; Joinery Tools; PSQ,Q39).

"Strategy is to utilise the company's plant as fully as possible. Investment strategy is geared to this objective". (P62; 400; C; OMG; Business Systems; PSQ,Q39).

"Investment geared to profitability but no specific effort is made to seek out the maximum return. Investment tends to be rather piecemeal". (P65; 30; B; OMG; Tents; PSQ,Q39).

REASONS FOR ADOPTING INVESTMENT STRATEGIES

There was little evidence of positive investment programming in the foregoing extracts. Indeed, very few of the smaller firms admitted to planning ahead beyond 12 months, and many merely invested when the need arose. How had these passive strategies been adopted? Table 3.3 below provides some answers.

Table 3.3 How Decisions to Adopt Investment Strategies Had Been Reached. Plymouth Survey

Strategy Derived From:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Health legislation				1 (11%)	1 (1%)
Market competition		1 (5%)			1 (1%)
Investment determined by events	11 (43%)	9 (50%)	5 (42%)	1 (11%)	26 (43%)
Traditional usage	1 (4%)	2 (12%)	2 (17%)	3 (34%)	8 (12%)

Table 3.3 (Continued)

Strategy Derived From:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Nature of market	4 (15%)	3 (18%)	4 (33%)	1 (11%)	12 (19%)
Policy of caution	4 (15%)				4 (6%)
Progressive attitude			1 (8%)		1 (1%)
Inflation and low returns		1 (5%)		1 (11%)	2 (3%)
Own funds policy	1 (4%)				1 (1%)
Policy of slow growth		1 (5%)			1 (1%)
Cost reduction required	3 (11%)	1 (5%)			4 (6%)
Parent policy				2 (22%)	2 (3%)
Shortage of funds, i.e. own.	2 (8%)				2 (3%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 40.

Mere statistics can, of course, conceal a considerable amount of individual data, and a deeper appreciation of Table 3.3 may be found in the following statements which were provided by the interviewees.

"Legislation regarding health factors has imposed certain investment decisions upon the firm. This has inhibited profit in one sense, but promoted it in others, e.g. confidence in the product". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 40).

"Market competition, i.e. necessity, has dictated our strategy of investment". (P2; 95; D; FDT; Brewing; PSQ,Q40).

"Three years ago the firm had a £1.75m overdraft. Currently making £48,000 profit and overdraft is reduced to zero. All investment had to be profitable, and all cash had to be put to work". (P3; 50; C; FDT; Confectionery; PSQ,Q40).

"Level of investment operation is fixed by the nature of the market. No investment strategy exists". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q40).

"Strategy is dictated by caution, e.g. no overdrafts, no hire purchase, no credit, etc. All items are paid for in cash from own reserves, otherwise investment is postponed". (P7; 20; C; FDT; Minerals; PSQ,Q40).

"No investment strategy. Investment carried out when required". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q40).

"Policy of first in the field relative to size of firm. Basically, a positive approach to investment, but firm unwilling to make major investment which is needed owing to regional problems". (P13; 170; B; MME; Steelwork; PSQ,Q40).

"Inflation has necessitated investment for efficiency policy. Profits have been low". (P14; 468; B; MME; Machine Tools; PSQ,Q40).

"Imposed strategy. Nature of market and overdraft has meant very limited investment apart from depreciation covering". (P15; 14; B; MME; Industrial Signs; PSQ,Q40).

"Strategy derived from own private philosophy of paying ones way as one goes along. Cash must be available for items otherwise investment postponed". (P16; 10; C; MME; Press Tools; PSQ,Q40).

"Experience in previous firm which suffered bankruptcy, has dictated investment thinking here". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q40).

"No strategy employed". (P24; 200; C; MME; Toolmaking; PSQ,Q40).

"Parent company policy to reduce delivery dates has influenced investment policy here. We might have invested for other reasons". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q40).

"Market has determined our strategy, i.e. forced onto firm rather than selected". (P27; 40; D; MME; Thermowells; PSQ,Q40).

"New firm. Policy of establishment necessary. Investment rather cautious". (P28; 4; B; MME; Aluminium Castings; PSQ,Q40).

"No strategy employed apart from repairs and maintenance". (P31; 50; B; MME; Steelwork; PSQ,Q40).

"No strategy employed. Investment decisions imposed from outside, e.g. quay belongs to Queen's Commissioners for Land. Thus, extensions not possible". (P33; 3; A; MME; Luxury Yachts; PSQ,Q40).

"Cautious investment approach adopted. Newly established firm". (P36; 122; C; EE; Communication Equipment; PSQ,Q40).

"Investment has kept pace with changing markets in the U.K. and abroad. Whether investment has been optimum is debatable". (P39; 800; D; TLCF; Footwear; PSQ,Q40).

"Traditional ploughback policy always adopted". (P41; 150; C; TLCF; Clothing; PSQ,Q40).

"Strategy imposed by market demand". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q40).

"Strategy determined by economic situation, e.g. cut backs". (P43; 13; C; TLCF; Wet Suits; PSQ,Q40).

"Lack of own funds has restricted investment despite constantly rising demand". (P45; 23; C; BPG; Pottery; PSQ,Q40).

"Current inflationary wage rates, material costs, and high overheads, have necessitated certain investments simply to reduce costs". (P48; 25; C; OMG; Furniture; PSQ,Q40).

"Investment strategy determined by the market. Firm is too small to engage in large scale investment operations". (P49; 19; B; OMG; Blinds; PSQ,Q40).

"Strategy the result of traditional usage". (P50; 44; C; OMG; Cardboard Boxes; PSQ,Q40).

"Investment currently at standstill. This is largely the result of lack of own funds. Orders have been turned down as capacity is inadequate". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q40).

"Vertical investment policy stimulated by the need to re-equip owing to Dutch Elm Disease eliminating the supply of the required raw material". (P52; 22; D; OMG; Coffins; PSQ,Q40).

"Strategy of replacement imposed by necessity, i.e. nature and size of firm obviated the need for large scale investment. Yet new investment has attracted work". (P54; 24; B; OMG; Printing; PSQ,Q40).

"Policy determined by the need to survive, and desire to remain at the present size". (P55; 25; A; OMG; Vehicles; PSQ,Q40).

"Recent positive strategy imposed by plant obsolescence". (P56; 50; B; OMG; Printing; PSQ,Q40).

"Investment undertaken to increase market share was imposed by competition and building industry trade cycle effects". (P59; 175; D; OMG; Ready Mixed Concrete; PSQ,Q40).

"Policy inflicted by U.S. parent company". (P62; 400; C; OMG; Business Systems; PSQ,Q40).

Again, the picture seemed fairly clear. Strategies had rarely been pre-planned, but had been adopted as a consequence of some specific event or crisis. The economic situation was a factor repeatedly quoted. It was difficult to imagine how these firms could be producing other than satisficing returns at best over the longer term. But to what extent did the firms themselves consider that their investment "strategies" and investment returns had been successful? What levels of investment achievement were acceptable to the firms? How was investment success actually defined and measured? The following extracts give some pointers for consideration.

CONCEPTIONS OF SUCCESS OF INVESTMENT STRATEGY

"Successful up to 1970, then some unexpected competition". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 41).

"Investment has enabled firm to survive and become established". (P2; 95; D; FDT; Brewing; PSQ,Q41).

"Investment strategy led to overdraft being cleared plus £48,000 profit per annum. But it should be noted that £26,000 of the £400,000 assets consists of goodwill". (P3; 50; C; FDT; Confectionery; PSQ,Q41).

"Firm's investments have been satisfactory but more modern equipment should have been introduced sooner". (P4; 600; D; FDT; Baby Foods; PSQ,Q41).

"Survived the 12 original firms in the Plymouth area. Caution regarding credit has been largely responsible for this". (P7; 20; C; FDT; Minerals; PSQ,Q41).

"Would have enjoyed far more success had the new building been acquired as discussed from time to time". (P8; 300; C; FDT; Bread; PSQ,Q41).

"Firm has established itself and survived, but excessive profits have not been made". (P9; 15; D; FDT; Fertiliser; PSQ,Q41).

"Company has been profitable but perhaps could have been more profitable if investment strategy adopted to cover the longer term". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q41).

"Returns on capital have been satisfactory if not excessive". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q41).

"Investment policy has encouraged repeated demand for the main product". (P12; 18; C; MME; Injection Moulds; PSQ,Q41).

"Keeping pace. Original strategy was one of growth. Current strategy is geared to efficiency largely as a result of inflation". (P14; 468; B; MME; Machine Tools; PSQ,Q41).

"Survival". (P15; 14; B; MME; Industrial Signs; PSQ,Q41).

"Customers retained". (P16; 10; C; MME; Press Tools; PSQ,Q41).

"Survival has been achieved over four years of operation and economic crises". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q41).

"Sales have risen from nil to £1.6m in 10 years". (P20; 120; B; MME; Luxury Boats; PSQ,Q41).

"Between 10% and 15% sales expansion per annum has been achieved since the 1950's. This could have been higher if more representatives had been placed". (P21; 1; A; MME; Repair of Cracked Cylinder Blocks; PSQ,Q41).

"Survival". (P22; 21; B; MME; Boats; PSQ,Q41).

"No strategy adopted. Firm could have been more successful if overall investment policy had been implemented". (P23; 50; B; MME; Iron Castings; PSQ,Q41).

"Survival since 1957". (P24; 200; C; MME; Tool-making; PSQ,Q41).

"Strategy has meant survival". (P27; 40; D; MME; Thermowells; PSQ,Q41).

"Survival plus moderate profit since 1966". (P28; 4; B; MME; Aluminium Castings; PSQ,Q41).

"Firm has established itself, but could possibly have done better". (P31; 50; B; MME; Steelwork; PSQ,Q41).

"Company has survived but performance sub-standard in view of expanding and high potential market". (P34; 20; B; EE; Cold Rooms; PSQ,Q41).

"Firm has achieved satisfactory returns and recently was considered worthy of being taken over". (P35; 20; B; EE; Electric Motors; PSQ,Q41).

"Survival and maintenance of competitive position". (P36; 122; C; EE; Communication Equipment; PSQ,Q41).

"Adequate profits only. Investment returns and growth could have been higher if automated machine strategy had been pursued". (P40; 158; B; TLCF; Clothing PSQ,Q41).

"Profits steady over the past 5 years, except 1974 where profits were down by 50%". (P41; 150; C; TLCF; Clothing; PSQ,Q41).

"Currently surviving but will have to operate at a lower production level. Originally pursued sales growth policy but economic climate responsible for change of approach". (P43; 13; C; TLCF; Wet Suits; PSQ,Q41).

"Survival in the face of competition and building industry trade cycle". (P44; 45; D; BPG; Glass; PSQ,Q41).

"Investment policy has enabled the firm to remain competitive". (P48; 25; C; OMG; Furniture; PSQ,Q41).

"Successful development over the years, then taken over. This in itself can be construed as an indication of success". (P49; 19; B; OMG; Blinds; PSQ,Q41).

"Slow growth over 140 years, then rapid expansion after vital decision to acquire new premises and equipment. Vertical investment highly successful". (P50; 44; C; OMG; Cardboard Boxes; PSQ,Q41).

"Orders have been won but could have taken more if plant capacity had been right. Shortage of own funds for investment a major problem here". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q41).

"Investment strategy has ensured survival along with reasonable profits". (P53; 20; C; OMG; Furniture; PSQ,Q41).

"Not over successful performance. Profits have been low and excess capacity has been high". (P54; 24; B; OMG; Printing; PSQ,Q41).

"Firm has continued in business but performance has not been consistent". (P55; 50; A; OMG; Printing; PSQ,Q41).

"Investment strategy has meant that company has shown growth over 16 years and market share has developed, but profit margins are low". (P59; 175; D; OMG; Ready Mixed Cement; PSQ,Q41).

"Main product has resulted in failure. No investment strategy will guarantee success. The market always determines results. Our strategy was competent, but the result was failure. New product and markets are now being developed". (P62; 400; C; OMG; Business Systems; PSQ,Q41).

"Product has been successful but investment financial side has been disappointing, i.e. return on capital has been marginal". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q41).

"Strategy of investment informality. Reasonable success has been achieved over 100 years of operation in the area. But possible that definite investment approach could have produced more acceptable results". (P65; 30; B; OMG; Tents; PSQ,Q41).

Conceptions of success of investment "strategies", where they existed, covered a wide range, e.g. survival, cleared overdrafts, profitability, being taken over, £1.6m sales in 10 years, growth, repeated demand, and maintenance of competitive position. Some firms, of course, repeated that no strategy had been employed, yet they too had survived. Were these "successes" optimal? No firm had actually claimed this. Most were content with satisfactory returns, although some had admitted to disappointing results which might have been avoided if action had been taken at the crucial time. Of the firms declaring "survival" as a measure of success, the majority and perhaps not surprisingly, came from the 0-24 employee group. The impression was that the smaller the firm, the greater the vulnerability, and survival could indeed be construed as a successful outcome of operating under difficult economic circumstances. These attitudes to "investment strategy" gave further weight to the likelihood of satisficing performance at best.

INVESTMENT PROBLEMS

During recessionary conditions it is perhaps natural for firms to claim that investment is low as a result of future uncertainty. Companies might also argue that output

could fall if the rate of inflation was not brought more into line with foreign competitors. Manufacturers could indeed cut back or postpone investment because of bleak growth forecasts and anxieties about the effects of inflation on tight liquidity positions. But did firms take the opposite view when industrial conditions were favourable? During a period of economic difficulty, firms in the Plymouth Survey were asked to specify their main investment problems, the objective being to find out if economic conditions were entirely responsible for sub-optimum investment. If key personnel identified factors other than inflation, government policies, price control, rising wage bills, and costs of borrowing, then the remedies could lie more within the firms themselves rather than with central government. The following is a sample of what certain firms considered to be their main investment problems.

"Firm expected to be taken over by Scotts. Eventually was taken-over by Unigate. This take-over uncertainty inhibited investment considerably". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 42 and 43).

"Sales need to grow to stimulate investment. Too much unnecessary competition in the area with seasonal problem. Merging could reduce costs, stabilise prices, raise sales, and increase investment over the longer term". (P2; 95; D; FDT; Brewing; PSQ,Q42 and 43).

"Fluctuating demand to changes in price brought about by unpredictable external factors such as sugar prices, make investment decisions difficult". (P3; 50; C; FDT; Confectionery; PSQ,Q42 and 43).

"We do have independence over investment but parent has the final say. This affects our thinking, e.g. we used to have 84% of the market in our main product, but this has been falling. We have some ideas how to correct this, but as they are slightly out of the ordinary, Glaxo would veto. A separate problem is that

the birth rate has been falling by 7% to 8% per annum since 1968. This too has conditioned long term investment". (P4; 600; D; FDT; Baby Food; PSQ,Q42 and 43).

"Objections from the local council to our request to buy land to extend our premises to enable straight runs for lorries have been major disappointments. The firm is willing to invest but is prevented from doing so. But seasonal and weather cycles are the traditional irritants". (P7; 20; C; FDT; Minerals; PSQ,Q42 and 43).

"Investment tends to be in replacement items for obsolete plant. Equipment was originally made to fit the building. Our main investment problem revolves around whether to continue with the current policy or to obtain new plant". (P8; 300; C; FDT; Bread; PSQ,Q42 and 43).

"Croda management is generally regarded as good, but despite the possibilities of lean periods, the investment requirements of very small operating units tend to be ignored by the parent company". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q42 and 43).

"Recent losses constitute the greatest problem regarding investment since funds and borrowing powers are affected". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q42 and 43).

"Recent investment problems have been illiquidity and low rates of return on capital together with a downturn in the industrial trade cycle. These difficulties could be temporary as the market for steelwork has always been volatile, and the cycle has been an accepted risk. If industry is booming then we have secured orders. If work is scarce, then the larger and more competitive companies take over our work. Therefore, our investment could be wasted if trade remains low. The steelwork structures industry produces investment goods for other firms. But if trade is depressed, then investment goods are the first to be cut. The consequences of very low production for the steelwork industry can be severe, e.g. Webbs (Bury, Lancashire) closed down after a five week strike. Investment decision making is bound to be sensitive". (P13; 170; B; MME; Steelwork; PSQ,Q42 and 43).

"The order books of British machine tool companies are down to only 45% of a year ago, and there are fears of large redundancies. But the international trade recession is hitting foreign rivals too. Home trade in

the U.K. has been low for years because high taxation has prevented many concerns from modernising. At the same time there has been a sharp increase in imports of machine tools. Capital intensive companies must invest to economise, but our profit of 15% on capital does not match inflation at 25%. All this has affected investment planning". (P14; 468; B; MME; Machine Tools; PSQ, Q42 and 43).

"Investment problems have been basically those of illiquidity and low investment funds. These have arisen from inadequate profits due to government policy over the years, e.g. 52% corporation tax. There has also been the inescapable problem of very small firms occasionally requiring 'half a machine'. If we had the funds available the machine would simply be purchased". (P15; 14; B; MME; Industrial Signs; PSQ,Q42 and 43).

"Sound investment leads to profit but if profit is over taxed then investment is not worthwhile. We are the 'industry' locally. The product is unique and 90% is exported. The government over-taxes and offers no incentives. This has been our main investment problem". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q42 and 43).

"Shortage of investment funds problem despite reasonable profit made. External funds for investment are not employed as a policy. Occasionally, labour problems have also arisen. Labour investment is as vital as plant and machinery in this industry and currently the shortage of skilled labour could impair long term performance". (P20; 120; B; MME; Luxury Boats; PSQ,Q42 and 43).

"Basically the firm is the industry in the U.K., and this has led to some complacency regarding investment". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q42 and 43).

"Occasional problem of having to accept contracts in the first instance, and <u>then</u> looking around for specialist equipment to actually carry out the work". (P23; 50; B; MME; Iron Castings; PSQ,Q42 and 43).

"Our current delivery dates are poor, i.e. 18 to 24 months, but necessary investment to clear this has been slow owing to lack of government support, high taxation, lack of confidence, and general uncertainty". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q42 and 43).

"Investment problem has been mainly the shortage of funds as a result of low profitability". (P26; 70; A; MME; Trawler Repairs; PSQ,Q42 and 43).

"Customers withholding payment beyond 30 days coupled with the inevitable trade cycle has constituted a problem regarding investment". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q42 and 43).

"Currently (1975) the economic situation, e.g. lack of government control of inflation, is hindering our investment decisions. A general lack of confidence prevails and the fact that large firms, e.g. Herbert Tools Ltd., can also find themselves in difficulties, reinforces the problems of making longer term investment decisions". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q42 and 43).

"No machines are available to do most of the specialised work here. Thus, some sub-contracting, and less investing, is inevitable. Large firms can presumably invest to a formula. Very small companies rely very heavily on skilled labour, e.g. boat builders, which for us is not readily available". (P33; 3; A; MME; Luxury Yachts; PSQ,Q42 and 43).

"Investment falls between the need to raise sales and the desire to improve quality and service". (P34; 20; B; EE; Cold Rooms; PSQ,Q42 and 43).

"The main problem is that investment cannot be undertaken for long production runs. Each job is semi-specialised". (P35; 20; B; EE; Electric Motors; PSQ,Q42 and 43).

"Investment was essential in the establishment of this new firm. But the high cost of capital proved to be a major problem". (P36; 122; C; EE; Communication Equipment; PSQ,Q42 and 43).

"After ten years of frequent balance of payments deficits, credit squeezes, impositions of price control, uncontrolled inflation, the oil surcharge; and political crises, the main investment problems are those of uncertainty". (P37; 27; C; EE; Location Systems; PSQ,Q42 and 43).

"Certain aspects of our investment decision making are controlled by headquarters, e.g. plant overheads are covered and no investment in stock is permitted. This

means rather less independence than we would like although we are fairly free in most matters. But investment is inhibited to some extent". (P39; 800; D; TLCF; Footwear; PSQ,Q42 and 43).

"The industry is retail determined. Also, the economic situation has compounded this. If recessionary conditions apply, then slow delivery of materials, delayed payments by customers, and increased imports of foreign clothing occur. Investment decisions become difficult when such a situation persists". (P40; 158; B; TLCF; Clothing; PSQ,Q42 and 43).

"The main investment problem is the opportunity cost of not investing, balanced against the cost of investing in an uncertain market. A subsidiary problem is the notoriety of obsolescent machinery in the industry". (P41; 150; C; TLCF; Clothing; PSQ,Q42 and 43).

"Textiles is a declining industry but our investment decision making is considerably eased by continuing government contracts for naval uniforms. The problems would arise if these contracts were withdrawn". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q42 and 43).

"Basic problem has been that recent investment involved the firm in expense rather than income. We moved from an old unsuitable site in 1970 into large new premises which had to be rented since purchase would have been prohibitive. Investment in machinery to eliminate excess capacity will have to be undertaken in phases. For example, the building required a crane at a minimum cost of £5,000. The result has been about 50% excess capacity which is costly. And the building industry trade cycle has added to our problems. Regional aid was rejected but no reason can be given for this decision". (P44; 45; D; BPG; Glass; PSQ,Q42 and 43).

"Seasonal forecasting, innumerable lines, absence of mass production, foreign imports, and the economic situation have all made investment planning difficult". (P46; 140; C; BPG; Pottery; PSQ,Q42 and 43).

"Notable issues in investment decision making have been whether to invest for design or mass production in blinds, and how much more should we invest in our diversified product of double glazing". (P49; 19; B; OMG; Blinds; PSQ,Q42 and 43).

"It is known that manufacturing industry operates in cycles and we are dependent on orders from that sector.

If manufacturing industry is involved in a crisis, e.g. 3 day week, then we are similarly affected". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q42 and 43).

"The market requires specific designs but the greater the specialisation the shorter the production run. Open stock cannot be carried. Thus, investment never realises an optimum return and both investment and capacity tend to be lower than desired". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q42 and 43).

"The main investment problem facing the firm is finding the equipment which will eliminate most of the 50% waste of material involved in the production process". (P52; 22; D; OMG; Coffins; PSQ,Q42 and 43).

"Investment is determined by continuance of government contracts which could be withdrawn, and the level of spending on education which could be reduced". (P53; 20; C; OMG; Furniture; PSQ,Q42 and 43).

"Several investment problems exist. Profit has been low and the banks are aware of this. Excess capacity has reached 25%. Inflation, lack of confidence generally, and the impossibility of investing for long production runs have all contributed to our investment decision difficulties". (P54; 24; B; OMG; Printing; PSQ,Q42 and 43).

"Obsolete machines have to be replaced since there are no spare parts for these. This investment would take place if our own funds were available. Up to date investment in the Printing industry is vital in order to avoid joining the 50 firms per year which leave the industry". (P56; 50; B; OMG; Printing; PSQ,Q42 and 43).

"One-off production does not lend itself to heavy investment, but the economic situation is the major problem regarding investment decisions". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q42 and 43).

"Investment problems for the firm are nearly always the result of the building industry trade cycle". (P59; 175; D; OMG; Concrete; PSQ,Q42 and 43).

"The building industry trade cycle makes investment planning difficult. But advantage could be taken of recessionary conditions by investing in preparation for the upturn. Unfortunately, this tends not to be done". (P60; 106; C; OMG; Building Materials; PSQ,Q42 and 43).

"Three main problems exist: (i) forecasting future

demand; (ii) knowledge of failure to maintain the main product; and (iii) the long chain of decision making from Plymouth to the U.S.A. via London. Investment decisions could be correct but implemented too late". (P62; 400; C; OMG; Business Systems; PSQ,Q42 and 43).

"Basically, the industry is labour intensive and reliance upon this factor is heavy. Unfortunately, labour and demand tend to be seasonal and investment is hindered accordingly". (P65; 30; B; OMG; Tents; PSQ,Q42 and 43).

Whilst there was little doubt that a recessionary economic situation affected the decision to invest, it was equally clear that other, and perhaps more basic, factors were relevant. When the total population was taken into account just 31% believed that general economic conditions, and the lack of government action were responsible for their investment problems. Although it could be argued that some of the problems other than the economic situation were also outside the control of the firm, many of the difficulties quoted did seem to be self-imposed, e.g. lack of idependence from parent, obsolete plant, too small an operating unit, investment complacency, sales versus quality argument, and so on. The impression was that investment by many of the firms would have been sub-optimum irrespective of the economic climate. On the other hand, it might be that favourable industrial conditions could encourage marginal investment, but perhaps no more than that. Moreover, it must be borne in mind that the table below shows the <u>main</u> responses only; any subsidiary comments, apart from those above, being ignored. Thus, the 31% could be slightly under-stated in the sense that the majority of the firms were unhappy about economic conditions and inflation, but did not give this factor top priority in their list of investment hindrances.

Table 3.4 Reasons for Investment Uncertainty. Plymouth Survey

Investment Hindered By:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Take-over possibilities				1 (11%)	1 (1%)
Slow growth of sales		1 (5%)			1 (5%)
Industry trade cycle		6 (36%)	3 (26%)	1 (11%)	10 (16%)
Lack of independence from parent				3 (33%)	3 (6%)
Economic situation and lack of govt. action	8 (19%)	3 (19%)	5 (42%)	3 (33%)	19 (31%)
Absence of planning permission	1 (4%)				1 (1%)
Obsolete plant				1 (11%)	1 (1%)
Too small an operating unit	2 (8%)				2 (3%)
Lack of profit for investment	3 (11%)	1 (5%)	1 (8%)		5 (9%)
Skilled labour shortage	1 (4%)				1 (1%)
Investment complacency	1 (4%)				1 (1%)
Forced investment to complete contracts		1 (5%)			1 (1%)
Sales V Quality argument	1 (4%)				1 (1%)
Absence of long prodn. runs	3 (11%)				3 (6%)
High cost of capital				1 (8%)	1 (1%)

Table 3.4 (Continued)

Investment Hindered by:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Rapidity of equipment obsolescence		1 (5%)	1 (8%)		2 (3%)
Reliance on continuing govt. contracts	1 (4%)	1 (5%)			2 (3%)
Rectifying recent investment mistake of occupying too large premises		1 (5%)			1 (1%)
Seasonal demand	2 (8%)	1 (5%)	1 (8%)		4 (7%)
Forecasting demand		1 (5%)			1 (1%)
Investing for design or mass prod'n	2 (8%)				2 (3%)
Finding equipment to eliminate 50% waste of materials	1 (4%)				1 (1%)
Constant usage of new investment		1 (5%)			1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Questions 42 and 43.

It is worth noting that the 19 firms (31%) who quoted the economic situation as the main investment problem were spread fairly representatively among the four employee groups. These firms had particular views about

the consequences of worsening economic trends. And they were, of course, supported to a lesser extent by the other firms who felt that although their difficulties could be attributed to more specific factors, the economic situation could not be dismissed.

Collectively, the Plymouth Survey firms believed that local industry was in some respects subject to certain factors beyond the control of individual managements. These factors included fluctuations in world trade supply and prices of raw materials, monetary policies both in the U.K. and in the countries with whom they traded, increasing government legislation that seemed to be antagonistic to free enterprise, and uncontrolled inflation. These were combining to raise a serious lack of confidence within manufacturing industry particularly when management was faced with decisions regarding future investment.

Owing to all this and falling demand, many Plymouth Survey firms were working below capacity. This inevitably was giving rise to greater unemployment and short time working. And the trend was beginning to affect even the capital goods and heavy engineering industries where the time lag between receiving orders and the supply was considerable.

Every settlement that resulted in wage and salary earners receiving more than the retail price index change caused further anxiety regarding the loss of jobs. Additionally, because everything that the firms paid for, labour, materials, fuel, transport, electricity, rates, postal charges, etc., was increasingly costly, managements were finding it difficult to maintain an adequate level of working capital. One firm (P3) had actually eliminated its working capital although this had been its policy for some time. It was often pointed out that if

costs rose by say X% the management had correspondingly to increase the amount of cash it had available for such purposes as paying wages and purchasing materials simply to maintain the same level of activity before it could even consider increasing output.

Because of price control and high taxation most companies were unable to generate the extra liquidity needed for increased working capital out of their own profits. Consequently, they were forced to seek assistance from the banks and other institutions although the majority of the smaller firms in the survey preferred not to do this. Even if costs of borrowing were relaxed the interest payable on overdrafts could be a burden on the company's resources and could in fact make it impossible to accept fresh orders (P51).

The firms in the machine tool and steelwork industries (P14 and P13) indicated that foreign buyers placing large contracts for capital equipment which could take several years to complete, understandably, insisted on fixed prices, and competitors in other countries where inflation rates were lower than in the U.K., could meet this requirement more easily. Firms also admitted that they had turned down orders because they could not forecast their costs accurately enough when inflation was high and rising. They also felt that foreign competitors' prices were such that insufficient profit could be made to afford the interest charges for the finance required. And they could not be sure of the effects of certain government policies. For example, the 1975 Capital Transfer Tax could threaten many family firms, and the Industry Bill was also causing concern regarding take-overs. Generally, most firms considered governments to have been anti-industry over the years.

Clearly, it would be a mistake to underestimate

the economic climate's effect on investment decision making, but at the same time this was by no means the only influence, and in any event Table 3.5 shows that the relationship between economic conditions and investment is tenuous. It could well be the case that most industrial investment problems, including the lack of capital spending, could be solved more by resolute management rather than by arbitrary economic upturns.

Table 3.5 Manufacturing Industry Capital Expenditure 1970-1975 U.K.

Year	Investment £m (Real)	Percentage Change on Previous Year	Capital Expenditure Index	Economic Climate
1970	2130		100.0	Expansion
1971	1991	-6.5	93.4	Expansion
1972	1738	-12.7	81.5	Expansion
1973	1864	+7.2	87.4	Recession
1974	2087	+11.9	97.9	Recession
1975	1820	-12.7	85.3	Recession

Source: Department of Industry Survey January 1976.

INVESTMENT FLEXIBILITY

One test of investment efficiency might be the response of capital spending to some important short term development. For example, did firms invest in accordance with manpower levels? Was investment geared to output changes, or a required level of assets? To what extent had profit (or surpluses following changes in costs or taxation), prompted investment? It seemed important to examine short run investment behaviour as opposed to capital spending which had been determined largely by longer term and traditional policies, to test optimality.

In an attempt to assess the flexibility of short run investment decision making, firms were asked to give examples, if any, where capital expenditure had been undertaken outside the normal patterns of long term investment.

"The relationship between investment and labour has been confined to that level of spending necessary to comply with strict safety regulation in this industry. It has never been the company's policy simply to cover depreciation and no fixed % of funds have been invested annually. Although investment would be fairly insensitive to short run changes in say, taxation, sales, costs, etc., which could increase funds available, past profit has been strongly linked with all our investment activities". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 45, 46, 47, 48 and 49).

"Some negative investment has been undertaken to cut manpower and costs but this was basically a long term decision. Investment in response to short run increases in demand has been minimal. Assets have been revalued from time to time, but there has been no policy to set investment at a fixed % of the level of these assets per annum. Profit in the past has not necessarily produced a springboard for automatic investment but this has probably been the most obvious investment relationship. Reductions in taxation leaving more surplus funds available could be used for the marginal investment". (P2; 95; D; FDT; Brewing; PSQ,Q45, 46, 47, 48 and 49).

"Investment and manpower have been related to the extent that a rented computer has been installed to cut labour costs. Sustained increasing output levels in response to demand would normally stimulate investment long term only. Growth by specific ploughback policy would be a satisfactory system but investment here has been on a 'need' basis. Funds available for investment are probably more important than the 25% return normally required. Changes in taxation, etc., could influence investment but, again, over the longer rather than shorter period". (P3; 50; C; FDT; Confectionery; PSQ,Q45, 46, 47, 48 and 49).

"Other firms in the area benefitting from regional aid have been able to offer higher wages and we have lost 20% of our packing force. We couldn't produce what we

could sell. Thus, some short term investment to avoid labour engaged in packaging has occurred. But a crisis inspired it. There has been no appreciable relationship between output levels and investment, and there have been no specific attempts to balance capital spending with depreciation on a yearly basis. However, profit has certainly influenced borrowing powers, which in turn has affected short run investment. When profit has been low then non-vital investment has tended to be held back. Thus, profit has stimulated investment in the short (and longer) term. If costs, taxation, etc., were reduced then this would not be a signal simply to invest. The firm would make its own decision on what capital items were required". (P4; 600; D; FDT; Baby Food; PSQ,Q45, 46, 47, 48 and 49).

"We have had some labour problems but we have not considered investing in machinery to solve this. We have no policy to relate investment to the level of assets or to cover depreciation. Profit has not actually determined investment but obviously it has been a major factor in the mechanics of capital spending. Similarly, if funds were increased, e.g. by tax reductions, then the surpluses could be used for investment although there would be no guarantee of this in the short run". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q45, 46, 47, 48 and 49).

"The firm was damaged during the war and re-investment became necessary. The emphasis then was on automated machinery, but we probably reached the limit of this process some years ago. If demand exceeds 300 doz. bottles per hour then we reject work rather than undertake short run investment to cope. The firm has grown over the years bu we have no conscious policy of asset expansion by sustained investment. Capital expenditure is only entertained if we can pay cash, and therefore, the relationship between investment and past profit is strong. Clearly, any changes which increase our reserves and enable us to pay cash would influence our short run investment decisions". (P7; 20; C; FDT; Minerals; PSQ,Q45, 46, 47, 48 and 49).

"Some investment has taken place to raise labour efficiency, but we have no specific intention of creating redundancies by this method. Output should have been higher, but this has not been possible in the present obsolete plant, although some short run investment might have helped temporarily. No specific allocation of funds for investment is budgeted, and most capital spending has been in the repair and maintenance category. If profits were high and sustained, then investment would

be stimulated along with borrowing powers. And if taxation were reduced then the majority of reputable small firms would use the surpluses for investment, and probably more short run spending could take place". (P8; 300; C; FDT; Bread; PSQ,Q45, 46, 47, 48 and 49).

"There has been no relationship between labour and short run investment. Output has been governed by plant capacity and particularly the drier. Investment could raise output but the issue remains unresolved. Repairs and maintenance have always been covered although no policy of asset growth by sustained investment exists. Profit could stimulate investment but new spending tends not to be geared to factors other than basic necessity". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q45, 46, 47, 48 and 49).

"Investment has taken place to reduce production time and to raise output in the short run, although this expenditure was probably necessary for other reasons, e.g. to replace worn out machinery. But profit has been the real investment motivator, and any increased funds as a result of changes in costs, would almost certainly go into direct investment in the longer, if not shorter, term". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q45, 46, 47, 48 and 49).

"The labour force has always been considered to be too small to be affected by short run investment. As far as demand is concerned, a persistent increase would only raise investment in the longer term. Changes which resulted in larger profits would probably stimulate investment since a ploughback policy has always been adopted". (P12; 18; C; MME; Injection Moulds; PSQ,Q45, 46, 47, 48 and 49).

"Investment and labour strength are not not easily related since the gap between manpower and automation is large. In any event, this would be a long term operation. Outputs of previous periods have induced later investments, but again, over the longer term. The firm has some policy of asset awareness, and depreciation does tend to be afforded priority. Long run profit potential has initiated investment and past profit has provided the funds. Changes in pricing policy, taxation, rates of interest, regional aid, etc., are long overdue by governments, but there would be no guarantee that any surplus funds would actually increase investment in the short term, and especially if trade were tight". (P13; 170; B; MME; Steelwork; PSQ,Q45, 46, 47, 48 and 49).

"The plant is already capital intensive and the labour force is probably at a minimum. We have no plans to implement short run investment to reduce manpower further. Output fluctuations are caused by the operation of the trade cycle in this industry. If demand were stable then short run investment would be undertaken. However, profit has stimulated investment, and the lack of it might render capital spending even more necessary in order to raise returns. If government price control (1975) were abandoned then target profit could be reached as not all orders would be lost by necessary price increases. The resultant profit would certainly be applied to further capital expenditure". (P14; 468; B; MME; Machine Tools; PSQ,Q45, 46, 47, 48 and 49).

"There are few prospects of reducing our skilled labour force and thus no short run investment is contemplated to economise on labour. Output would have to rise permanently to stimulate a positive investment programme either short or long run. But capital expenditure would be automatic to cover depreciation. Past profit has been a notable indicator of possible investment and, for example, tax reductions would probably have the same effect in many small firms". (P15; 14; B; MME; Industrial Signs; PSQ,Q45, 46, 47, 48 and 49).

"No relationship exists between labour strength and short run investment. If output is rising over the longer term due to extra demand and profits and reserves are available, then new machinery is likely to be purchased but not as a short term measure. Although we are interested in growth it is not our procedure to attempt to increase asset levels by simply investing on an annual basis. A ploughback policy is adopted but not all funds are for machinery, surpluses being placed in reserves. If these reserves are increased in any way, e.g. by reduced taxation, and equipment is required, then investment takes place". (P16; 10; C; MME; Press Tools; PSQ,Q45, 46, 47, 48 and 49).

"Our product has to be built by skilled labour, and although some semi-automatic equipment is available, we do no engage in this type of investment. However, some labour saving devices have been installed. No particular relationship exists between output levels and short run capital spending. If demand were to increase over the longer term, then investment would be likely but not guaranteed in the short run, since we have adopted a policy of cautious growth to avoid the fate of a similar firm bankrupted by over-trading. Past profit is the key to

investment when the conditions are right. Any surpluses from profit would eventually be converted into capital equipment". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q45, 46, 47, 48 and 49).

"It is not really possible to undertake short run investment in order to reduce manpower since 90% of the labour force is skilled. Nevertheless, some capital spending could take place to replace the fabrication side of production, but over the longer term. Output has been rising over the past 10 years and profit has always been ploughed back. To some extent, therefore, output levels have influenced investment on a year to year basis. There is also some degree of relationship between ploughback and asset growth. In any event investment would always more than cover depreciation. Investment has been influenced by profit both long and short run. A reduction in taxation would simply provide extra funds for capital spending already decided upon. Thus, profit merely influences the scale of investment rather than determining it". (P20; 120; B; MME; Luxury Boats; PSQ,Q45, 46, 47, 48 and 49).

"Very few automated processes are possible here, and short run investment has never occurred simply to economise on labour. Output levels and capital expenditure are only related in a long term sense. Our policy of ploughback has tended to consolidate asset values, but again, over longer periods of time. Long term investment has been encouraged by past profits, but vital investment, e.g. short run, has proceeded irrespective. The relationship between high taxation and short run investment is arguable. High tax and low profit could in fact stimualte capital spending in an effort to raise returns. On the other hand, corporation tax at 52% is probably over optimum, and a reduction could provide the required incentive for small firms to engage in long term vertical investment". (P22; 21; B; MME; Boats; PSQ,Q45, 46, 47, 48 and 49).

"Our labour force has been fairly constant and no short run investment has taken place to change this. If order books are long, then investment could be considered, but contracts are not actually sought after. Funds for investment are vital. Surpluses do tend to be ploughed back although we have no committed policy on growth. Clearly, any changes in these funds, e.g. by tax reductions, would enable a more vigorous ploughback policy to proceed". (P23; 50; B; MME; Iron Castings; PSQ,Q45, 46, 47, 48 & 49).

"Profit is channelled into investment, and any changes in costs which increased our surplus would similarly be converted into capital equipment. Most investment decisions, however, would be long rather than short term". (P24; 200; C; MME; Toolmaking; PSQ,Q45, 46, 47, 48 and 49).

"No conscious attempt has been made to simply reduce the labour force by specific investment. All jobs here are one-offs and the majority of staff are skilled, but if wage rates were to become prohibitive then labour economies would have to be considered. Also if delivery dates worsened, a decision would have to be taken regarding more automation to speed up output albeit in a limited way. There is no relationship between asset levels and short run investment although we would always attempt to increase fixed assets rather than reduce them. Profit has helped to determine what could be spent on investment although it has never been an actual determinant. If tax were lowered, then investment here would probably rise. Any increase in costs, wages, taxation, etc., would influence investment planning and spending adversely. Maximum profit is not our basic philosophy but a working profit is needed, and if it is not obtained then other decisions are affected, not least investment". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q45, 46, 47, 48 and 49).

"We have always considered, in principle, the machine which replaced labour, but this has not really been an active policy. Investment has responded to increased demand but not in the short run. Past profit has been the factor which has influenced investment more than any other, but it would be misleading to consider it a determinant. Investment depends on basic need and the funds available enable the spending to proceed". (P27; 40; D; MME; Thermowells; PSQ,Q45, 46, 47, 48 and 49).

"We are not aware of short run investments being related to manpower, levels of output, or value of assets. But profitability has determined our borrowing powers for investment over the longer term". (P28; 4; B; MME; Aluminium Castings; PSQ,Q45, 46, 47, 48 and 49).

"Although manpower tends to be specialised here, we have always been interested in labour cost reduction equipment to stabilise price and encourage sales. If this policy led to increased profit, then investment in the next period would tend to be more ambitious, provided

that the market existed. A reduction in taxation, which is long overdue, would produce the same effect, although not necessarily in the very short run". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q45, 46, 47, 48 and 49).

"Since only three staff are employed here, no relationship between the labour strength and short run investment could exist. And output cannot be increased significantly (assuming that demand prevailed) simply by acquiring new equipment. But excess profit might stimulate heavy investment over the longer run, e.g. purchase of quay if this were possible. Since profit is low, changes in taxation, costs, etc., would only very marginally influence investment in the following period. Nevertheless, there is a relationship here". (P33; 3; A; MME; Luxury Yachts; PSQ,Q45, 46, 47, 48 and 49).

"With short run one-off jobs it would be difficult, but not impossible to implement investment to raise efficiency. Additional capital spending could, for example, raise sales, but this could be at the expense of quality. Profit over a sustained period would certainly influence investment ultimately, e.g. by helping to determine borrowing powers. Reductions in taxation would simply help liquidity generally and could initiate investment especially if the government insisted that the tax relief should be spent entirely on capital items". (P34; 20; B; EE; Cold Rooms; PSQ,Q45, 46, 47, 48 and 49).

"If machinery could be demonstrably certain to reduce labour then the firm would consider this, although there is a limit to the process. Investment would only become vertical if output were substantially raised over the long rather than short term. The company is fairly new and a slow growth policy has been employed to avoid the problems of overtrading. But investment would never simply be based on growth alone. Profit would ease short run investment decisions but not necessarily determine them, and changes in reserves which reduced the need to borrow, would always be powerful influences regarding capital expenditure". (P36; 122; C; EE; Communication Equipment; PSQ,Q45, 46, 47, 48 and 49).

"Profit of the previous period would always be a real motivator of current capital expenditure if (i) vertical investment is low; (ii) the company is a new firm establishing itself; and (iii) the outlay is not prohibitive". (P38; 8; B; EE; Control Panels; PSQ,Q45, 46, 47, 48 and 49).

"Labour has been volatile between 1970 and 1974 with a peak around 1971. This unreliability could have been solved by short run investment but the decision was not implemented. The quality standard required does tend to prevent investment on 100% production routine basis. Quality control demands labour. Our peak investment occurred in 1973 with the establishment of the Plymouth plant which was considered vital at the time. Profits were also good prior to this decision and there could well be a relationship here. Revaluations occur each year (from 1975) which distorts the investment equals depreciation policy. Sales are inversely related to the economic situation and thus economic conditions could provide indicators for future investment. But generally, short run investment is not undertaken in response to short run changes". (P39; 800; D; TLCF; Footwear; PSQ,Q45, 46, 47, 48 and 49).

"Machinery which can cut back labour tends to be a prominent investment incentive although not on a short run basis. Automation is possible (and becoming more so) but we have been slow to respond. Large quality outputs are feasible but, again, we have delayed the decision to enter the mass production market, and short run benefits have been lost as a result. Profit provides the finance (or the borrowing powers) for investment, and changes which raised profits, e.g. reduced taxation, would add to these funds. But profit would not necessarily be the prime motivator. The need to speed up output whilst retaining quality is the over-riding factor". (P40; 158; B; TLCF; Clothing; PSQ,Q45, 46, 47, 48 and 49).

"Investment which speeded up the production process would always be awarded priority as labour turnover tends to be high. If output has to be raised in the short run we simply recruit more labour rather than invest. Yet we have 50% excess capacity and short run investment might have solved this problem. A relationship has been established between growth of assets and investment as a fixed % is allocated for investment each year, i.e. the short period. If conditions changed and caused profits to increase then the funds would be available and fewer applications for capital expenditure would be shelved. The expected rate of return tends to be rather less important in these rejections. However, our short run investment flexibility has been rather limited". (P41; 150; C; TLCF; Clothing; PSQ,Q45, 46, 47, 48 and 49).

"Investment has always been sought to effect labour efficiency but some union problems have arisen. An

objective has been to cut unloading times of glass (a considerable time waster) from 3 hours to $1\frac{1}{4}$ by 2 special cranes costing £2,000. But this would not really be regarded as short run investment. There would be no need to invest if output levels had to rise since we have approximately 50% excess capacity brought about by the move from the old premises into new ones far too large for the purpose. Investment tends to be geared to replacement rather than growth, but the latter could be the solution to reach full capacity. Profit would ease investment decisions but would not actually determine them. The dilemma is whether to invest for growth on a large scale, or to continue the replacement policy in view of the current excess capacity. Changes in finance available via, say reduced taxation, might actually make this unresolved problem more difficult to solve. For this firm, extended and predictable order books would be the main investment indicator, but even so not over the very short run". (P44; 45; D; BPG; Glass; PSQ,Q45, 46, 47, 48 and 49).

"Investment has been based on long term plant planning and improvement rather than specific rates of return, and having one's own funds available from profits has enhanced this policy". (P45; 23; C; BPG; Pottery; PSQ,Q45, 46, 47, 48 and 49).

"Capital spending has been more influenced by past rather than expected profit. If no profit is to hand then borrowing becomes necessary and the company is basically against this. Generally, investment does not take the form of covering short run problems". (P47; 13; B; BPG; Pottery; PSQ,Q45, 46, 47, 48 and 49).

"Changes in reserves which increased liquidity would create confidence and the marginal investment item would be encouraged, and possibly in the short run. Profit would enable a certain degree of investment flexibility". (P48; 25; C; OMG; Furniture; PSQ,Q45, 46, 47, 48 and 49).

"Output levels via the activity of manufacturing industry have been investment determinants over the long run. But the decisions have not been taken quickly, and production could have been made to respond at earlier stages. A policy of ploughback has been used although no large profits have been made. Management has been rather less than rigorous regarding investment generally. If profits were raised, and manufacturing industry enjoyed a boom, then investment here would follow but probably not over the short period". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q45, 46, 47, 48 and 49).

"We only employ three units of labour and could not really reduce this by automated machinery. It is known that if we could deliver more quickly (some orders have been lost by this) we would generate more business. Short run investment would appear to be the solution. Funds have been short however and outside credit is not favoured. The firm is too small for a link between capital expenditure and short term growth to exist, and we would prefer a large investment to raise capacity but this would be a once and for all exercise. Own funds available and past profit record are always helpful when investment needs to take place but potential should carry much more weight where outside credit is involved. Taxation is too high. We pay the same tax rate as I.C.I., yet we serve an important market and there could be more investment, product development, exports, etc., if we were allowed to keep what is earned". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q45, 46, 47, 48 and 49).

"Profit provides the means for investment (long rather than short run) and tends to be more important than expected rates of return". (P53; 20; C; OMG; Furniture; PSQ,Q45, 46, 47, 48 and 49).

"A substantial build up in demand might encourage new investment, but the decision would depend on the level of excess capacity currently running at 25%. No set % is spent each year on capital, and no ploughback policy exists. Significant profit over the long term would probably be channelled into investment provided that the market was certain. Government grants could solve the problem especially on building which is usually vital and tends to produce the highest returns or benefit. But claiming aid is an 'impossible' task". (P54; 24; B; OMG; Printing; PSQ, Q45, 46, 47, 48 and 49).

"Recently a cleaning plant was installed to cut labour time down but this was not short run investment. We prefer output levels to remain constant and very little short run investment has been undertaken to achieve output levels beyond the targets required. A ploughback policy has always been adopted but not simply to increase assets short term. Changes which raised profit, e.g. lower taxation, would improve this ploughback although there would be no guarantee that investment would take place in the shorter periods". (P55; 25; A; OMG; Vehicles; PSQ,Q45, 46, 47, 48 and 49).

"It is not always wise to re-tool simply to exclude labour, the only factor which is inter-changeable. The

relationship between investment and manpower has been weak for this reason. The rate of return tends to be vital for credit for new investment, but a profitable 'track record' is also necessary to initiate the process. Investment would respond to any changes which increased this profit but since the building industry suffers severe time lags there could be no guarantee of capital spending in the short runs despite the profit potential of such action". (P60; 106; C; OMG; Building Materials; PSQ,Q45, 46, 47, 48 and 49).

"Investment has been carried out recently to save labour costs but this equipment will not be used due to the change-over to the new main product. Short run investment decisions could give misleading results, e.g. if assets rose in value then the rate of return could fall which, in turn, might postpone further investment. Profit is probably the real determinant of investment, short and long runs, since it makes capital spending possible on the one hand, and the lack of it makes investment necessary on the other". (P62; 400; C; OMG; Business Systems; PSQ,Q45, 46, 47, 48 and 49).

"Very little short run investment takes place. But profit, past and expected, would be a strong investment influence if not a determinant". (P65; 30; B; OMG; Tents; PSQ,Q45, 46, 47, 48 and 49).

Whilst many of the firms could indicate links between the variables selected, i.e.(labour, output, assets, profit, and changes in costs) and investment, there was very little evidence to support these relationships over the short run, despite profit potential. The flexibility normally associated with small firms certainly did not apply to short term capital expenditure, and the lost opportunities could have been considerable. For example, two almost identical firms in the clothing industry had conflicting views about whether automated processes were possible or not. Other firms said that they would not invest if their own funds were not available, whilst several companies ploughed back into equipment or reserves almost irrespective of requirements. Most firms, however, were aware of the importance of replacement in particular

and depreciation covering in general.

But the main indication was that profit led to investment, although rarely in the very short term. To state that investment was low was simply another way of saying that profits, i.e. funds available, were depressed. Profit gave resources for management to expand, and where appropriate, the incentive for investors to provide further liquidity. But we have already witnessed, for example, that small firms tended not to respond automatically with investment even when the economic climate was favourable. Similarly, investment would not necessarily be high even during periods of relatively high profits, e.g. during the very early 1970's. Against this, certain schools might argue that profit was no test of the need for investment and quote British Leyland and Alfred Herbert during 1975 as examples. These concerns might not have deserved credit injections. They might not have even offered prospects of positive returns. But, nevertheless, most observers would have agreed that large scale investment was required.

However, as far as small companies were concerned it remained true that provided that new plant or machinery were required in the normal course of events, large ex-ante profits were likely to influence investment far more than any other factor. Unfortunately, despite the link between profitability and capital expenditure, short run investment flexibility was virtually non-existent, and this clearly reduced the prospects of optimum investment and ultimate returns. Incidentally, investment accounting relationships are developed more fully in Chapter 9.

ACTIVE AND PASSIVE INVESTMENT

Having established a basic relationship between investment and past profit, although not strong over the very short period, it would perhaps be misleading to assume that capital spending was dominated by this factor alone. There were instances where recent investment had been undertaken for reasons other than profit availability. But was this investment "active" or "passive"? Was it visionary or merely replacement investment? Was it positive, or had it simply been imposed by a crisis? If it could be demonstrated that capital spending had been largely vertical, then the chances of investment optimality would be enhanced. Firms were asked to give some recent examples of actual investment decisions, and the following is a selection.

"A Fanco Double Linker was installed to do the work of 11 operatives, and to reduce production time whilst producing a more standard product. The 'redundant' staff were re-deployed and production actually doubled with the same staff involved". (Code P1; Employees 486; Production Run Category C; S.I.C. FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 51).

"Some negative investment has been necessary in certain areas, e.g. long overdue closure of the Tamar Brewery due to obsolescence, spare capacity elsewhere, and excessive cost of refurbishing". (P2; 95; D; FDT; Brewing; PSQ,Q51).

"A computer supplying information on deliveries, orders, prices, stock, etc., has recently been rented to cut clerical costs over the long run. Also, a new warehouse was purchased for £130,000 which was urgently needed due to severe shortage of space". (P3; 50; C; FDT; Confectionery; PSQ,Q51).

"Some packaging machinery was recently installed (£150,000) to cover a depleted labour packing force. But the equipment has not worked well, and the investment

is not likely to give optimum returns". (P4; 600; D; FDT; Baby Food; PSQ,Q51).

"No major investment has been carried out recently except for repairs and maintenance". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q51).

"Investment has been limited to normal repairs and maintenance with some improvements". (P6; 450; D; FDT; Meat; PSQ,Q51).

"The cost of a new labeller is £3,000 but we obyained a second hand one for £200. A comprehensive Filler has also been purchased second hand. The machines were required as replacements". (P7; 20; C; FDT; Minerals; PSQ,Q51).

"No specific important examples of investment can be quoted except for repairs and maintenance of our obsolete plant and machinery". (P8; 300; C; FDT; Bread; PSQ,Q51).

"Very little investment has been undertaken recently except for basic replacement and repair of equipment". (P9; 15; D; CAI; Fertiliser; PSQ,Q51).

"Investment tends to be in labour rather than in equipment. For example, during Asian Flu epidemics or winter months, investment in part-time labour occurs". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q51).

"A horizontal milling machine has replaced several small mills and reduced production time per unit". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q51).

"No investment of any magnitude has been undertaken except for repairs and maintenance". (P12; 8; C; MME; Injection Moulds; PSQ,Q51).

"The main investment item in the last five years has been an extension to the plant in 1972 at a cost of £200,000". (P13; 170; B; MME; Steelwork; PSQ,Q51).

"Two milling machines (£23,000) have recently been acquired to increase efficiency of production on special contract work. An £85,000 Planer has also been purchased as replacement equipment. Finally, a small computer has been installed for general purposes". (P14; 468; B; MME; Machine Tools; PSQ,Q51).

"A £500 Wadkin cutting machine giving exactness of cut has been a recent purchase. The objective was to obtain quality cutting of our sign plates with less sharpening of the blades required. But the machine was only installed after the old one wore out". (P15; 14; B; MME; Industrial Signs; PSQ,Q51).

"We acquired our new premises in 1971 which was really based on the urge to be our own boss. Since then, several small items of equipment have been purchased. For example, a Worcester 18 ton press was bought in 1972 for £2,700. We considered a more suitable 30 ton press at £3,500 but decided on the 18 ton model because we could pay cash for it. The machine proved to be inadequate and eventually it broke down completely. The suppliers replaced the machine under guarantee with the 30 ton version and we made up the difference with the help of the bank. The replacement machine has proved to be infinitely more versatile and satisfactory. Presumably we should have used bank funds for this machine in the first instance". (P16; 10; C; MME; Press Tools; PSQ,Q51).

"No major investment examples are available, repairs and maintenance apart". (P17; 90; C; MME; Packaging Machinery; PSQ,Q51).

"We rent the building but own the tools. We have no projected investment plans for the near future despite profit potential, 90% exports, etc". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q51).

"All investment has been repair and maintenance recently". (P19; 60; B; MME; Boats; PSQ,Q51).

"In 1972 a £15,000 moulding shop (plus a £10,000 extension) was installed. In 1974 a new £10,000 finishing shop was held up by the uncertain economic situation. But a further building is to be taken over on another site during 1975. All this investment has been undertaken to keep output in line with demand". (P20; 120; B; MME; Luxury Boats; PSQ,Q51).

"Investment has generally consisted of miscellaneous repairs, maintenance, and minor improvements to existing plant". (P22; 21; B; MME; Boats; PSQ,Q51).

"A number of one-off orders have been obtained and this has necessitated a certain amount of inevitable investment to complete the contracts". (P23; 50; B; MME; Iron Castings; PSQ,Q51).

"Our policy has been mainly one of repairs and maintenance based on necessity". (P24; 200; C; MME; Toolmaking; PSQ,Q51).

"Investment since 1964 has been largely on plant extensions, e.g. 1964 10,000 ft^2 Plymouth factory, followed by a 20,000 ft^2 extension in 1967, and a further 22,000 ft^2 in 1970. A final 50,000 ft^2 was added in 1971. All this was in line with company growth policy although whether this expenditure has reaped optimum returns is arguable". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q51).

"No major investment spending has occurred recently". (P26; 70; A; MME; Trawler Repairs; PSQ,Q51).

"Recent investment here has been on a replacement basis". (P27; 40; D; MME; Thermowells; PSQ,Q51).

"No specific examples of investment are available apart from routine small items". (P28; 4; B; MME; Aluminium Castings; PSQ,Q51).

"Investment has consisted mainly of machinery to improve the production flow, plus normal repairs and maintenance". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q51).

"The installation of an air cleaning process to save labour time and cost has been the only notable investment recently". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q51).

"No outstanding examples of heavy investment can be quoted apart from repairs and maintenance". (P31; 50; B; MME; Steelwork; PSQ,Q51).

"Very little vertical investment has been undertaken. However, repairs and maintenance, plus some improvement spending has occurred". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q51).

"Repairs and maintenance costs tend to be low here, and since we do not own the quay, major investment is also minimal. Some equipment has had to be hired to overcome this problem, e.g. overhead mobile cranes. The site is unsuitable, but we have not considered moving". (P33; 3; A; MME; Luxury Yachts; PSQ,Q51).

"A new building was bought in 1973 for £90,000

to replace the old one which was rented. This new factory is proving to be quite satisfactory, but the board could have had it for £45,000 five years earlier". (P34; 20; B; EE; Cold Rooms; PSQ,Q51).

"The firm was formed in 1970 and purchase of miscellaneous items such as mills, lathes, hand tools, drills, grinders, etc., was imperative in order to commence operation. But very little investment has been undertaken since". (P36; 122; C; EE; Communication Equipment; PSQ,Q51).

"Occasionally, investment has to take place if an order has been accepted beforehand, e.g. government contract. Basically, the policy os one of cost reduction and increased efficiency, and all investment is geared to this". (P38; 8; B; EE; Control Panels; PSQ,Q51).

"In 1973 a change-over from one factory to another took place at a conversion cost of £50,000. This expenditure was justified on the grounds of space, conditions, etc., and a low payback was expected. The new plant saved £30,000 in wage bills over the first two years, and the re-organised production flow proved to be more efficient. New conveyors were installed to cut out unnecessary movement of personnel and several old bottlenecks were eliminated. For example, three separate stitching and moulding machines were replaced by one overall machine which produced a better production rate and finished product. We are now considering replacing other such machines by similar investment. It has emerged that any one piece of investment can usually lead to another, i.e. a trial and error approach". (P39; 800; D; TLCF; Footwear; PSQ,Q51).

"Various multi-purpose automated machines (cutting, sewing, buttoning, etc) at £8,000 each have been added with the objective of speeding up production". (P40; 158; B; TLCF; Clothing; PSQ,Q51).

"A recent management consultants' report showed that £20000 would re-organise the production process and make better use of machine operators. Although it is not our main objective to reduce the labour force specifically we are, nevertheless, implementing the report". (P41; 150; C; TLCF; Clothing; PSQ,Q51).

"Very little current investment can be reported except for an £800 automated machine to give more labour reliability". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q51).

"Currently losses are being sustained and no investment is contemplated". (P43; 13; C; TLCF; Wet Suits; PSQ,Q51).

"A new building long overdue, is currently being rented but it has proved to be far too large for the purpose. Spending on equipment has included £2,000 for cranes and rotor arms for 11 ton loads, bringing the unloading time down from 8 hours to $1\frac{1}{4}$. But there has been some union difficulty here, and the prospect of cutting the time down still further has receded". (P44; 45; D; BPG; Glass; PSQ,Q51).

"No large scale investment examples can be given. Capital expenditure consists mainly of innovation aimed at improving old equipment". (P45; 23; C; BPG; Pottery; PSQ,Q51).

"All investment has been replacement but with the objective of cost reduction". (P46; 140; C; BPG; Pottery; PSQ,Q51).

"No major investment decisions have been reached in the recent past". (P47; 13; B; BPG; Pottery; PSQ,Q51).

"Capital spending has consisted mainly of routine woodworking items to cut costs, e.g. bandsaws". (P48; 25; C; OMG; Furniture; PSQ,Q51).

"No major investment spending has been carried out recently". (P49; 19; B; OMG; Blinds; PSQ,Q51).

"Output in our old plant had been traditionally stable over the years whilst demand from manufacturing industry had been volatile. If demand was high then we simply worked to full capacity and rejected a large number of orders. No forecasts long term could be made regarding future investment in premises too small for the market. Additionally, the factory was in two sections and administration and movement of equipment was difficult. But four years ago a decision was finally made to move to a new site on an industrial estate with the help of a 25% grant. It was estimated that 5,000 ft^2 would have been sufficient but 10,000 ft^2 was reluctantly purchased, i.e. it was available as one site, the grant was there, and the extra 5,000 ft^2 could be used for storage. After two years of operation, output has doubled and demand seemed to be created by our new ability to supply. Growth and profit have both been satisfactory, except for 1975. Thus, unsure accidental investment in the

marginal 5,000 ft^2 proved to be successful. The issue currently under discussion here is why this decision was not reached 10 years ago". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q51).

"We are currently considering replacing a colour mixing process which, although profitable, does not make the best use of labour, and is not pleasant to operate. Thus, investment is likely to proceed even though technically unnecessary". (P51; 3; B; OMG; Ceramic Transfers; PSQ, Q51).

"The change in supply from elm to veneer made retooling necessary. In this case investment was really crisis determined". (P52; 22; D; OMG; Coffins; PSQ,Q51).

"Investment has consisted mainly of repairs, maintenance, and some minor improvements". (P53; 20; C; OMG; Furniture; PSQ,Q51).

"A new extra floor (long overdue) has been inserted to increase storage by 20%". (P54; 24; B; OMG; Printing; PSQ,Q51).

"New premises have been our major investment recently. The old factory was obsolete and we should have moved years ago but bank finance conditions were considered (then) to be unfavourable". (P55; 25; A; OMG; Vehicles; PSQ,Q51).

"Two typesetter machines costing £11,000 each and one printing press costing £20,000 were installed during 1973-1974. The machines are half the size of the originals and thus more floor space has been released. They also give increased speed of production which helps to maintain reasonable prices in a highly competitive and specialist market". (P56; 50; B; OMG; Printing; PSQ,Q51).

"No investment items of a major nature have been undertaken". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q51).

"All recent investment has been of a miscellaneous nature". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q51).

"No large investment items have been undertaken but vehicles have been replaced to improve distribution efficiency". (P59; 175; D; OMG; Concrete; PSQ,Q51).

"One extra mill has been installed to raise output for one-off jobs". (P60; 106; C; OMG; Building Materials; PSQ,Q51).

"Most investment has been in the repair and maintenance category since setting up in 1971 at a cost of £10,000". (P61; 124; C; OMG; Joinery Tools; PSQ,Q51).

"A £1m investment in a re-equipment scheme for conversion to the new main product became imperative to enable the unit to survive". (P62; 400; C; OMG; Business Systems/Marine Gyros; PSQ,Q51).

"A video colour negative analyser has been installed at a cost of £15,000 for improved quality of the product. A new 3 bath processing machine costing £14,000 to speed up output has also been acquired. Both items were necessary to give longer production runs". (P63; 170; D; OMG; Colour Film Processing; PSQ,Q51).

"A main investment item was the building and its equipment in 1967. There has been no major spending since that date apart from occasional cost reduction and experimental need equipment". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q51).

"A PVC lockstitch welding machine was purchased to replace an obsolete machine in 1973. It was installed to speed up production from 1000 stitches to 3000 per hour. The modern approach is to chain stitch tents and we had to purchase the equipment to keep up to date". (P65; 30; B; OMG; Tents; PSQ,Q51).

A summarised analysis of the foregoing is presented in Table 3.6. Assuming that investment is either (i) active, i.e. vertical, visionary, pre-planned, etc., or (ii) passive, i.e. repairs, maintenance, replacement, imposed by necessity, etc., then we see that recent investment by 71% of the firms in the sample had been passive. It is also notable that the very small firms were far more guilty of this approach than the larger units. Even so, only 50% of these larger companies could claim to have been engaged in active capital spending. Incidentally, this picture was subsequently confirmed during enquiries regarding the determinants of investment.

Table 3.6 Active and Passive Investment. Plymouth Survey

Investment Category	Employee Group 0-24	25-99	100-199	200+	Totals
Active	5 (19%)	3 (17%)	7 (58%)	4 (44%)	19 (29%)
Passive	21 (81%)	15 (83%)	5 (42%)	5 (55%)	46 (71%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 51.

Whilst firm conclusions are difficult to reach at this stage, the general impression was that investment optimality was hardly likely if only some 29% of the firms had been engaged in visionary investment. And, of course, there was no guarantee that these firms would invest positively over the longer period.

LONG TERM INVESTMENT PLANNING

Long term investment planning would appear to be essential if optimality is to be achieved. Presumably, there is in theory, nothing to prevent a firm from ignoring what has happened in the past, or what can reasonably be expected to occur in the future, and still produce a satisfactory performance. But could this performance be sustained long term? If firms sought out long term indicators which could influence current investment, and paid serious attention to them, then the achievement of attainable investment levels, and attainable investment returns would be more likely than if those indicators were ignored. Firms in the Plymouth Survey were asked to specify which indicators, if any, helped to form general investment expectations for the future. Some examples are as follows.

"The firm has always adopted tried methods of forecasting demand which tends to be fairly stable. It would need a highly significant change in demand to affect investment patterns here". (Code P2; Employees 95; Production Run Category D; S.I.C FDT; Main Activity Brewing; Source Plymouth Survey Questionnaires, Question 52).

"Market trends have been traditionally based on a birth rate of approximately 7% of the total population. No other indicator is used". (P4; 600; D; FDT; Baby Food; PSQ,Q52).

"No real indicators are employed. Although the trade cycle is unpredictable in the short term, demand tends to be fairly stable long term, and investment is influenced by the latter rather than the former". (P6; 450; D; FDT; Meat; PSQ,Q52).

"Indicators for long term investment include the market cycle, liquidity, and general confidence. For example, 1973 was a peak year and encouraged investment thinking, but 1975 was doubtful, and this inhibited capital spending". (P7; 20; C; FDT; Minerals; PSQ,Q52).

"If the bread subsidy were removed (1975) then decisions would have to be taken to improve returns. But these decisions are not likely to be taken in anticipation". (P8; 300; C; FDT; Bread; PSQ,Q52).

"A recent indicator has been the link between Plymouth and Europe offering export possibilities. But no short run investment is likely". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q52).

"One major indicator might be the government's offering real incentives via regional aid, tax allowances, or favourable borrowing terms, e.g. Belgian firms can borrow at 2½% (1975). Another is the knowledge that the Plymouth site is unsuitable for an automated plant. Investment would take place to automate if the firm moved to another area, but as a local family firm we are not likely to do this". (P13; 170; B; MME; Steelwork; PSQ,Q52).

"Inflation is our current investment indicator for the future. For example, we used to have a 5 year plan system. Now we operate over 3 years". (P14; 468; B; MME; Machine Tools; PSQ,Q52).

"A useful investment indicator has been the availability of part-time labour". (P15; 14; B; MME; Industrial Signs; PSQ,Q52).

"Stable industrial trends would be favourable indicators for possible long term investment". (P17; 90; C; MME; Packaging Machinery; PSQ,Q52).

"Indicators are not considered. We aim for 12 to 14 boats per year and any excess demand is rejected. Investment tends to be restricted by this requirement". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q52).

"There are no indicators in seasonal work but favourable government policy would stabilise confidence and possibly lead to investment for the longer term". (P19; 60; B; MME; Boats; PSQ,Q52).

"The only indicator is the knowledge that the luxury boat will always sell and that the resultant profit can then be used for new investment to keep pace with demand". (P20; 120; B; MME; Luxuary Boats; PSQ,Q52).

"There are possibilities of a levelling out in demand as firms learn to apply our techniques themselves. But the heavy industrial work seems to be secure and is more profitable. We should take note of this situation and prepare the ground now". (P21; 1; A; MME; Cylinder Block Repairs; PSQ,Q52).

"There are no reliable indicators in this industry and we have to use historical data when assessing for the longer period". (P22; 21; B; MME; Boats; PSQ,Q52).

"The machine tool industry is too unpredictable for reliable indicators to be used for future investment". (P24; 200; C; MME; Toolmaking; PSQ,Q52).

"The African market potential is a possible indicator for future investment, but current economic and political climates have inhibited the decisions to proceed". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q52).

"We regard the market as short run and have never actually appraised possible indicators for long term investment decisions". (P26; 70; A; MME; Trawler Repairs; PSQ,Q52).

"There are no investment indicators in the engineering industry. The trade cycle is a fact of life and this is unpredictable". (P27; 40; D; MME; Thermowells; PSQ,Q52).

"In the past, levels of sub-contracting we could do ourselves have been indicators of investment we could

profitably undertake". (P28; 4; B; MME; Aluminium Castings; PSQ,Q52).

"No particular indicators exist and historical data has to be used. No forecasting and no market research are done on a significant scale". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q52).

"The building industry trade cycle cannot be relied upon to give accurate indications of future investment requirements". (P31; 50; B; MME; Steelwork; PSQ,Q52).

"No indicators are used. Investment proceeds as necessary to ensure survival". (P33; 3; A; MME; Luxury Yachts; PSQ,Q52).

"We are currently adopting a piecemeal approach to investment and long term indicators, if any, are not relevant". (P36; 122; C; EE; Communication Equipment; PSQ,Q52).

"There are no reliable indicators for long term investment in the electrical engineering industry". (P37; 27; C; EE; Location Systems; PSQ,Q52).

"A useful indicator of the level of investment needed for future operation has been the possibilities of occasional government contracts". (P38; 8; B; EE; Control Panels; PSQ,Q52).

"One important indicator in the trade for long term investment is the increase in the importation of cheap foreign footwear. But we are hopeful that government action will solve this problem". (P39; 800; D; TLCF; Footwear; PSQ,Q52).

"The possibilities and profitability of mass production would suggest that we should re-tool for this, but company policy forbids it". (P40; 158; B; TLCF; Clothing; PSQ,Q52).

"Foreign rivalry indicates that new investment is imperative to compete. Hopefully, the government will impose restrictions". (P41; 150; C; TLCF; Clothing; PSQ, Q52).

"The future is determined by current events and we are establishing a new priority of breaking even at the moment since there are no targets to aim at". (P43; 13; C; TLCF; Wet Suits; PSQ,Q52).

"Stabilisation of the building industry trade cycle, e.g. by nationalisation, would be a certain indicator for new investment here". (P44; 45; D; BPG; Glass; PSQ,Q52).

"The main investment indicator is historical data". (P45; 23; C; BPG; Pottery; PSQ,Q52).

"There are no investment indicators in seasonal trades". (P46; 140; C; BPG; Pottery; PSQ,Q52).

"Long term investment requirements are largely based on our historical records". (P48; 25; C; OMG; Furniture; PSQ,Q52).

"The only indicator would be one of constantly rising demand". (P49; 19; B; Blinds; PSQ,Q52).

"There is no way of forecasting manufacturing industry's demand for containers. Thus, investment tends to be based on need, and not on what should be invested now for the future. For example, we ought to supply nationwide, but carriage is too expensive. And we have not explored the possibilities of solving this by investing in a distribution system". (P56; 44; C; OMG; Cardboard Containers; PSQ,Q52).

"There are no real indicators for investment for the future except that of constantly rising demand. But even this is no guarantee that investment will take place". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q52).

"We use a 1.2% death rate and a known £150,000 market share to forecast sales. Investment has been influenced by these factors". (P52; 22; D; OMG; Coffins; PSQ,Q52).

"Central and local government spending on education are useful indicators for long term investment". (P53; 20; C; OMG; School Furniture; PSQ,Q52).

"Our main indicator is not to proceed without caution as the market is totally unpredictable". (P54; 24; B; OMG; Printing; PSQ,Q52).

"The quality of the work we produce determines future demand which in turn influences investment in the longer term". (P55; 25; A; OMG; Vehicles; PSQ,Q52).

"No indicators are employed for guides to investment for the future". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q52).

"The only indicator is the certain knowledge that no projections can be made in the building industry. Investment tends to be on a piecemeal basis". (P60; 106; C; OMG; Building Materials; PSQ,Q52).

"One dilemma (or indicator) under constant consideration is whether to invest and grow with a falling marginal rate of return, or to dis-invest and shrink with a rising rate of return". (P62; 400; C; OMG; Business Systems; PSQ,Q52).

"The firm is too small to forecast too far ahead. Basic need and funds available determine most investment here". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q52).

"A topical indicator is rising wage bills. But no quick decisions regarding investment to replace labour is imminent". (P65; 30; B; OMG; Tents; PSQ,Q52).

From the quoted responses it would appear that very few firms used likely future indicators as specific influences on their investment decisions. Many firms felt that no reliable indicators existed and, for example, considered themselves unavoidably conditioned by their industry's trade cycle. However, some firms had obviously appraised possible future developments, but whether investment had actually taken place in response to this is arguable. Table 3.7 below presents the main indicator groups taken from the total sample.

Table 3.7 Indicators for Long Term Investment Planning Plymouth Survey

Indicators	Employee Groups				
	0-24	25-99	100-199	200+	Totals
No real indicators apart from historical data and S.R. market trends	17 (64%)	14 (79%)	6 (50%)	3 (34%)	40 (62%)

Table 3.7 (Continued)

Indicators	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Long term appraisal of future markets & general confidence	2 (8%)	2 (11%)	2 (17%)	2 (22%)	8 (13%)
Improved government incentives	2 (8%)		2 (17%)		4 (7%)
Possible government contracts	1 (4%)	1 (5%)			2 (4%)
Likely funds available				1 (11%)	1 (1%)
Changes in competition		1 (5%)	1 (8%)	1 (11%)	3 (6%)
Government subsidy removal				1 (11%)	1 (1%)
New technol-ogical breakthroughs	1 (4%)				1 (1%)
Possible longer prod'n runs	1 (4%)				1 (1%)
Future level of sub-contracting	1 (4%)				1 (1%)
Mass prod'n possibil-ities			1 (8%)		1 (1%)
Long run expected rates of return				1 (11%)	1 (1%)
Future need for equip-ment stand-ardisation	1 (4%)				1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 52

Although perhaps all the firms had had their investment thinking influenced by economic indicators at some time or other, Table 3.7 above suggests that the link between current investment and likely future trends was not strong. Some 62% of the sample merely used historical data, short run market trends (although not necessarily guaranteeing short run investment), or claimed that no indicators were available or employed. All four employee groups were well represented in this category, and it is significant that the smaller firms figured more prominently than the the larger units.

Only 7% of the population had considered improved government incentives, a result which coincided markedly with the general disillusionment with regional aid and which is covered in Chapter 4. Yet it was repeatedly pointed out that one of the main determinants of investment was funds available from profit. If taxation, for example, were reduced giving more surplus funds, the chances were that investment would respond albeit over the longer term. But clearly, firms were not optimistic about the likelihood of government measures in this, and other areas, e.g. higher and more easily obtainable regional grants.

In general terms one is bound to conclude from the findings that long term investment planning was nominal, and the contribution which such a policy could make towards investment optimality was equally limited.

INVESTMENT DETERMINANTS AND INFLUENCES

One of the main features of the small business unit was the lack of complexity in its management structure. The average small firm in the Plymouth Survey was managed by

its owners who took nearly all the important decisions. Indeed, the Bolton Report (2) confirmed that over 85% of small firms in its postal survey were controlled and managed by one or two men, and usually one. This direct dependence on the proprietor was striking, and constituted both a source of strength and weakness for the small firm. For example, it accounted for the occasional rapidity of decision making, it made for employee morale, and ensured that the pursuit of solvency was not relaxed. On the other hand, as previously indicated, the skills and expertise of any one individual was demonstrably limited. The running of a small business by experience and commonsense could be effective so long as the scale of the firms' activities and the pressures from outside remained small. But optimality would not necessarily follow. And we have seen that even if scales of operation and outside pressures were manageable, profit was likely to be below par as a result of doubtful investment strategies, if any, and self-imposed investment problems reinforced by unfavourable economic uncertainties.

A survey of the pattern of industrial investment in the U.K. covering all sizes of firm was carried out by Taylor Nelson Services (3) and reported by them in "The Director" of November 1970. Arguing that investment was an essential ingredient for industrial progress, and that governments had been right to sress this, it was therefore disturbing to find that investment had risen less than 10% in real terms since 1964. Industrial capacity had grown slowly and imports had found easy markets. The authorities had offered grants and concessions to stimulate investment along with investment allowances and free depreciation, but governments could have been working in the dark if these incentives had been ignored. And it appeared that they had been ignored in the main by firms in the

Plymouth Survey. Only 9% of the firms claimed that they had been influenced in any way by regional aid; a point developed in Chapter 4.

The Taylor Nelson Survey covered 83 firms of which 14 were large with capital of £50 million and over; 37 were medium with capital between £10 and £49 million; and 32 were small with capital of less than £10 million. The following conclusions were reached:

(i) Industry needed higher profits if investment was to recover;

(ii) Tax concessions were of limited value since, in the main, they were not properly applied;

(iii) The rate of return was the decisive test for new investment, i.e. investment would only proceed if known to be profitable. (This particular finding expressed so positively was, of course, at variance with the Plymouth Survey);

(iv) Not all investments were calculated precisely;

(v) And governments could have been overlooking these factors.

Incidentally, the rate of return was the average annual return expressed as a percentage of outlay. For example:

Outlay £10,000

Returns (1) £4,000 (2) £3,000 (3) £2,000 (4) £1,000

$$\text{Rate of return} = \frac{4000 + 3000 + 2000 + 1000}{4} \times \frac{1}{10000} \times 100$$

$$= 25\% \text{ (or 4 years payback)}$$

The Taylor Nelson findings seemed to lend some support to the satisficing theory. It was claimed that investment depended to a large extent on ex-ante and ex-post profit, and that investment was low. Could it be that firms were not making even optimum profit? And even if they were, investments were not being rigorously appraised. Thus, the suggestion was that firms could have been losing

opportunities in the two crucial areas of profitability and investment.

Bearing the Taylor Nelson Survey in mind how was the decision to invest actually reached, and which factors determined investment in the Plymouth Survey firms? Interviewees were asked to consider this, and the reasons given for investing tended to be specific to each individual firm, but four main areas of influence could be identified, namely: (i) investment determined by necessity; (ii) investment determined by the desire to improve returns; (iii) investment determined by finance; and (iv) investment determined by miscellaneous factors. The following tables summarise the main responses which were claimed to either determine or influence investment decisions.

Table 3.8 Investment Determinants
Plymouth Survey

Investment Determined by:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Necessity					
Need for replacement investment	10 (39%)	9 (50%)	3 (25%)	2 (22%)	24 (40%)
Safety regulations				1 (11%)	1 (1%)
Repairs & maintenance	3 (11%)	2 (11%)	2 (17%)	1 (11%)	8 (13%)
Length of order books	4 (15%)	3 (18%)	2 (17%)	2 (22%)	11 (18%)
Totals:-	17 (65%)	14 (79%)	7 (59%)	6 (66%)	44 (72%)
Returns					
Minimum rate of return		2 (11%)			2 (3%)

Table 3.8 (Continued)

Investment Determined by:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Returns (Cont.)					
Long run profit potential				1 (11%)	1 (1%)
Plant expansion	2 (8%)				2 (3%)
Transport efficiency	1 (4%)				1 (1%)
Productivity				1 (11%)	1 (1%)
Automation potential		1 (5%)	1 (8%)		2 (3%)
Totals:-	3 (12%)	3 (16%)	1 (8%)	2 (22%)	9 (12%)
Finance					
Government subsidies				1 (11%)	1 (1%)
Own funds available	4 (15%)		2 (17%)		6 (10%)
Totals:-	4 (15%)		2 (17%)	1 (11%)	7 (11%)
Miscellaneous					
Trade cycle			1 (8%)		1 (1%)
Absence of representative	1 (4%)				1 (1%)
Planning permission	1 (4%)				1 (1%)
Piecemeal policy			1 (8%)		1 (1%)
Rival investment		1 (5%)			1 (1%)
Totals:-	2 (8%)	1 (5%)	2 (16%)		5 (5%)
TOTALS:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 44.

Table 3.9 Investment Influences
Plymouth Survey

Investment Influenced by:-	Employee Groups 0-24	25-99	100-199	200+	Totals
M5 motorway and wider product distrib.				1 (11%)	1 (1%)
Labour economies	1 (4%)	1 (5%)			2 (3%)
Rival investment	1 (4%)	2 (11%)	1 (8%)	1 (11%)	5 (8%)
Cost of borrowing	8 (30%)	3 (18%)	3 (25%)	4 (44%)	18 (28%)
Possibility of being taken-over			1 (8%)		1 (1%)
Credit available	3 (11%)	4 (23%)	2 (17%)	1 (11%)	10 (16%)
Rate of return	2 (8%)	1 (5%)	2 (17%)		5 (8%)
Miscellan-short run crises	4 (15%)	1 (5%)			5 (8%)
Regional aid	1 (4%)		1 (8%)		2 (3%)
Industrial trends				1 (11%)	1 (1%)
Own funds available	2 (8%)	5 (28%)	2 (17%)		9 (15%)
Outlay of project	2 (8%)	1 (5%)			3 (5%)
Increased demand	1 (4%)				1 (1%)
Contract delivery dates				1 (11%)	1 (1%)
Long term needs	1 (4%)				1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 50.

A selection of individual investment determinants and influences to supplement Tables 3.8 and 3.9 is as follows.

"Safety and health legislation have determined a good deal of our investment over the years, whilst current regional developments such as the extension of the M5 motorway, enabling the wider distribution of the product, has been influential". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires; Questions 44 & 50).

"Propositions to spend large amounts e.g. £100,000 are put to Group for final confirmation to ensure that the minimum rate of return (12%) will be made. Recent wage bills have been influencing the need to effect certain labour economies". (P2; 95; D; FDT; Brewing; PSQ, Q44 and 50).

"Basically, need determines investment, e.g. labour economies, reinforced by a 25% rate of return condition, if possible. Since we control about 60% of the marketing in the South West, rival investment is always considered to be a relevant factor". (P3; 50; C; FDT; Confectionery; PSQ,Q44 and 50).

"Estimation of acceptable (not maximum) long run profit has determined investment. There are no revolutionary eating habits in the baby food industry and thus investment planning has been fairly easy. On the other hand, the cost of borrowing has influenced the final decision occasionally, and investment has been postponed, e.g. 1975, a recessionary year". (P4; 600; D; FDT; Baby Food; PSQ,Q44 and 50).

"Investment has been conditioned mainly by the need to repair and maintain". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q44 and 50).

"Repairs and maintenance have been short run investments, whilst, for example, decisions to expand the scale of operations would be long run. In either case, a prohibitive cost of borrowing could postpone the expenditure". (P6; 450; D; FDT; Meat; PSQ,Q44 and 50).

"Need has been the basic determinant of investment coupled with possibilities of obtaining equipment at second hand prices, and the ability to pay cash". (P7; 20; C; FDT; Minerals; PSQ,Q44 and 50).

"If the government removed the subsidy on bread then new investment would probably become essential for this obsolete plant, provided that the cost of borrowing could be met. Hire purchase facilities could also in-

fluence these decisions". (P8; 200; C; FDT; Bread; PSQ, Q44 and 50).

"The degree of importance attached to the new machinery would be crucial, the expected rate of return on investment only being relevant if considered too low". (P9; 15; D; CAI; Fertiliser; PSQ,Q44 and 50).

"The need to invest is usually a self-evident decision following events. For example, Asian Flu caused short run demand to increase which we attempted to meet by short run investments in labour". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q44 and 50).

"Investment is determined basically by the need to invest in order to raise capacity, lower costs, increase production, repair and maintain, etc. But the cost of borrowing and finance availability could postpone this expenditure". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q44 and 50).

"Necessity of new machine or labour has been the major determinant, but heavy costs of capital and lack of funds could influence postponement". (P12; 8; C; MME; Injection Moulds; PSQ,Q44 and 50).

"The main determinant of investment is profit potential after agreement that new equipment is required". (P13; 170; B; MME; Steelwork; PSQ,Q44 and 50).

"Inflation and illiquidity have impressed the need to invest to raise returns in response to rival techniques. But inflationary costs of borrowing might influence postponement". (P14; 468; B; MME; Machine Tools; PSQ,Q44 & 50).

"Demand for the product is fairly predictable thus very little investment is actually undertaken, apart from necessary repairs and maintenance. Even so, the lack of funds and costs of borrowing have to be taken into account". (P15; 14; B; MME; Industrial Signs; PSQ,Q44 and 50).

"Profit and funds available would signify that investment could take place. Then we would look around for whatever was needed. An exception to this would be that untoward events could influence short run investment, e.g. machine breakdowns". (P16; 10; C; MME; Press Tools; PSQ, Q44 and 50).

"Need, especially on the occasional one-off contract, which could have been secured prior to set-up, has

determined most of our investment given an acceptable rate of return. Funds available from profit would add weight to the decision to proceed". (P17; 90; C; MME; Packaging Machinery; PSQ,Q44 and 50).

"If work is excessive we sub-contract rather than invest in new equipment. The firm is only four years old and a consolidation approach has been adopted. If government credit were available at, say 5%, then this would change our policy". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q44 and 50).

"Investment is determined by necessity and the expected rate of return, and influenced by finance availability". (P19; 60; B; MME; Boats; PSQ,Q44 and 50).

"Investment has been determined by the profit made in the previous period. Thus, if taxation were reduced, for example, the extra profit would be channelled into capital spending". (P20; 120; B; MME; Luxury Boats; PSQ,Q44 and 50).

"Absence of a representative in a prominent area, e.g. Plymouth dockyard, tends to determine investment in a specialist technician, e.g. training and placement. Then it is usually the case that unexpected work is attracted to the representative, e.g. English China Clays. Despite this, placements have been slow in certain areas". (P21; 1; A; MME; Repairs Cylinder Blocks; PSQ,Q44 and 50).

"Occasionally, investment has been 'forced' in the sense that contracts have been obtained, e.g. one-offs, and then machinery has been sought to do the work. Credit squeezes, etc., have tended to postpone rather than c ncel investment". (P23; 50; B; MME; Iron Castings; PSQ,Q44 and 50).

"If equipment is vital, then investment proceeds, subject to reasonable credit availability, minimum rate of return, acceptable cost of borrowing, regional aid if any, etc". (P24; 200; C; MME; Toolmaking; PSQ,Q44 and 50).

"Since all work undertaken is of the one-off variety, then customer demand determines investment in equipment to complete the contracts, sometimes irrespective of credit availability. But the economic situation, finance availability, company growth policy, cost of borrowing, availability of Eurodollars, and rivalry to a small extent, all influence investment decisions to some degree". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q44 & 50).

"Repairs and maintenance tend to be the major capital expenditures. Thus, past profit tends to be more important than expected rates of return". (P26; 70; A; MME; Trawler Repairs; PSQ,Q44 and 50).

"The basic investment determinant is the need to invest to reduce costs at existing production levels". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q44 & 50).

"If we owned the quay this would stimulate investment, e.g. installation of a permanent overhead crane. Our capacity potential is thus limited, and we are constrained by this. The site is not ideal and if demand increases we merely work overtime, or reject orders". (P33; 3; A; MME; Luxury Yachts; PSQ,Q44 and 50).

"Reliability of the transport fleet is all important and this receives instant priority. Once the decision to invest has been taken, very few influences are likely to affect it". (P34; 20; B; EE; Cold Rooms; PSQ,Q44 & 50).

"The outlay and the expected rate of return are important investment considerations, but basic need is the major determinant". (P35; 20; B; EE; Electric Motors; PSQ, Q44 and 50).

"Investment proceeds if required to do so, e.g. change over from one factory to another across a road meant that re-equipment was automatic. Investment has also been determined by the desire to improve production rates". (P39; 800; D; TLCF; Footwear; PSQ,Q44 and 50).

"Machinery which speeds up the production flow, de-skills the operator, and reomoves thinking, is afforded priority, provided that such items as cost of capital, finance availability, etc., are favourable". (P40; 158; B; TLCF; Clothing; PSQ,Q44 and 50).

"Investment depends on the item in question. If it is considered to be vital, then spending would simply take place, irrespective of any constraints". (P41; 150; C; TLCF; Clothing; PSQ,Q44 and 50).

"Machinery which utilised unskilled labour giving reliability and lower costs, subject to profit, i.e. finance available, would influence investment". (P42; 26; D: TLCF; Naval Uniforms; PSQ,Q44 and 50).

"Current losses do not encourage investment activity even though external finance might be profitable on a pie-

meal basis". (P43; 13; C; TLCF; Wet Suits; PSQ,Q44 & 50).

"The need for new premises determined this investment. But the move resulted in expense rather than income since we are now carrying 50% excess capacity. The decision to eliminate this by further capital spending (which could discourage competition) has been unresolved for some time". (P44; 45; D; BPG; Glass; PSQ,Q44 and 50).

"Investment here is determined by necessity or replacement". (P46; 140; C; BPG; Pottery; PSQ,Q44 and 50).

"Investment has been determined by the known growth of demand of about 10% per annum, and the need to cut costs of production". (P48; 25; C; OMG; Furniture; PSQ,Q44 & 50).

"Need (and accident to some extent) has been the main investment determinant. For example, the move from the old obsolete premises into the new factory was long overdue. And as the three day week delayed the delivery of a Crossland Punching Machine, a Semi-Automatic was purchased instead. Thus, the Semi-Automatic (and others) was obtained as a result of events". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q44 and 50).

"Investment is determined by finance availability, need for horizontal investment, need for greater output from each unit (labour) of production, need for vertical investment (but costly and funds are usually short), and the need for reduced costs. Investment could be influenced by the 'human factor'. Our printing method is effective and earns money, but it is not very efficient or pleasant to use. Thus, operators have to be changed at intervals, and investment in a new process could take place simply to improve this situation". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q44 and 50).

"Continuing government contracts have stimulated investment in equipment to cope". (P53; 20; C; OMG; Furniture; PSQ,Q44 and 50).

"Repairs, maintenance, and safety, have been the major investments here. Also, the absence of forecasting has tended to inhibit capital expenditure that should have taken place". (P54; 24; B; OMG; Printing; PSQ,Q44 and 50).

"The need for new machinery and whether it can be worked full time usually determines investment, whilst the cost of borrowing, and the availability of funds could

influence this". (P55; 25; A; OMG; Vehicles; PSQ,Q44 and 50).

"Modernisation of our process requires top priority, but the decision has been delayed mainly as a result of the economic situation". (P56; 50; B; OMG; Printing; PSQ,Q44 and 50).

"Circumstances determine investment, e.g. on one-off jobs it is usually necessary to obtain extra equipment to cope with an already secured contract". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q44 and 50).

"Investment tends to be undertaken on a short run piecemeal basis as the building industry trade cycle prevents capital expenditure on a large continuing scale. Additionally, inflation has meant that more funds are required which could have been used for investment". (P60; 106; C; OMG; Building Materials; PSQ,Q44 and 50).

"Capital expenditure will soon be undertaken to prepare for our new product. The existing line failed and thus, investment for re-tooling will be an automatic and necessary decision. The cost of borrowing, size of outlay, target yield, etc., are merely subsidiary to the main objective". (P62; 400; C; OMG; Business Systems; PSQ,Q44 and 50).

"Investment has tended to be determined by internal, e.g. finance available, rather than external factors, e.g. cost of borrowing". (P63; 170; D; OMG; Colour Film Processing; PSQ,Q44 and 50).

"Rival investment (and general activity) has been observed over the years and we have responded to some extent, i.e. subject to acceptable costs of borrowing". (P65; 30; B; OMG; Tents; PSQ,Q44 and 50).

The impression was that investment was inspired mainly by necessity or circumstance which rendered capital spending imperative. Strategic approaches to investment, i.e. long term planning were either not apparent or weak, and this finding found reinforcement in the 1971 Greater Manchester Study (4).

"Capital investment has been decided by old plant

and machinery becoming obsolete, or beyond repair. It has also been based on the cutting of production costs by more efficient production. The last capital investment undertaken was the purchase of a high speed mixer on which paints can be produced in a fraction of the time taken by older types of machines. Obsolescence must always be an important determinant of investment in this industry". (Code GM5; Employees 25; S.I.C CAI; Main Activity Paint; Source Greater Manchester Study; Question 11).

"Investment tends to be influenced by (i) company policy generally; (ii) length of order books in the medium term, and perhaps more importantly; (iii) the productivity potential and cost reduction. For example, recent purchases have been two multi-spindle turrent drilling machines at a cost of £4,000. The decision was based entirely on productivity, i.e. the speed-up of a sub-assembly work in the production flow. Capital costs saving would be paid for in approximately three years over previous methods". (GM12; 54; MME; Marine Searchlights; GMS,Q11).

"The saving of labour costs is considered important, thus the purchase of combined suction equipment at a cost of £7,000 to speed up production, is a recent move in this direction". (GM14; 95; MME; Calender Bowls; GMS, Q11).

"The company is shortly changing premises and will face large increases in the cost of the space it occupies. Future investment is likely to be influenced by space economy, e.g. two new plug board controlled lathes (eventually three) will replace six or seven conventional capstans in little over half the space". (GM17; 45; MME; Toolmaking; GMS,Q11).

"A new profile burning machine has been ordered in order to cope with lengthening order books". (GM18; 14; MME; Sheet Metal; GMS,Q11).

"Our equipment is of a standard nature, central lathes, milling machines, vertical drillers, etc., and some jobs require special tooling, e.g. for one-off jobs. It is not unusual for us to accept a contract, and then have to look around for specialist machinery to do the work. Investment becomes a necessity in such cases". (GM20; 5; MME; General Engineering; GMS,Q11).

"We invest to meet current requirements, but even so, only if we can pay cash. In the past, government

grants have been incentives. Thus, investment here has been influenced by a combination of demand, profitability, and aid". (GM33; 30; OMG; Printing; GMS,Q11).

"We have recently installed a machine to meet the change in method of construction of our product. This was necessary to meet competition from outside". (GM34; 200; OMG; Woodworking; GMS,Q11).

"Investment plans are subject to the volatile nature of the industry, which is particularly vulnerable to the credit policies of governments. Credit squeezes impact readily in this industry, and our investment is reflected by this". (GM36; 130; OMG; Furniture; GMS,Q11).

Clearly, the main determinant of investment was the need to invest in new plant or machinery as a result of some pressing factor or event, e.g. urgent replacement investment, investment to comply with safety regulations, repairs and maintenance, and length of order books. Indeed, this represented some 72% of the total responses, and all four employee groups were well involved.

A characteristic of Table 3.8 was that only 12% of the sample regarded the "rate of return" as a major determinant. In other words, capital spending was likely to proceed even if the yield was below target, provided that the investment item was actually needed, and that own funds were available, or the cost of borrowing was not prohibitive, in which case, the investment could be postponed. This hardly suggested the pursuit of investment optimisation. Indeed, where investment had been rendered imperative, firms had simply taken avoiding action.

If firms undertook investment then it would normally be assumed that they did this to obtain a return, the ultimate objective being long run increased profit. However, the Plymouth Survey showed that once the decision to invest had been reached (ignoring the method of investment appraisal at this stage) the rate of return appeared

to be of subsidiary importance. Again, very little evidence of investment optimisation here.

As far as investment influences were concerned, these merely reflected the issues which had affected, or would affect, marginal investment decisions. For example, once capital spending had been agreed, then the decision could have been influenced, but not necessarily postponed, by the items reported in Table 3.9.

Of course, it could be argued that firms who invested in response to some need, or marginal influence, did this in order to secure certain long term benefits. This was never in dispute. The issue under review was whether investment levels and investment returns were optimum or not. It seemed likely that the latter was the case, and individual responses added weight to this. In the P.E.P. Report "Attitudes in British Management" published in 1965 (5) the terms "sleepers" and "thrusters" were employed. The majority of the Plymouth Survey firms seemed to assume the role of "sleeper" as far as investment was concerned.

SUMMARY

OVERALL INVESTMENT STRATEGIES There was little evidence of positive investmentthinking, e.g. 70% of capital expenditure was horizontal, and very few of the smaller firms admitted to planning ahead beyond 12 months, and merely invested when the need arose.

CONCEPTIONS OF SUCCESS OF INVESTMENT STRATEGIES Of the not inconsiderable number of firms who declared survival as a measure of success, the majority fell within the 0-24 employee group. General attitudes to investment

strategy gave weight to the satisficing hypothesis.

INVESTMENT PROBLEMS Whilst there was little doubt that a recessionary economic situation affected the decision to invest it was equally clear that other, and perhaps more basic, factors were relevant, and in most cases individual investment problems could have been tackled by resolute management.

INVESTMENT FLEXIBILITY Whilst many firms could indicate links between the selected variables (labour, output, asset levels, and profits) and investment, there was little evidence to support these relationships over the short period. Despite a strong link between past profit and capital expenditure, short run investment flexibility was virtually non-existent and this clearly reduced the prospects of optimum investment and optimum investment returns.

ACTIVE AND PASSIVE INVESTMENT Investment optimality was likely to be impaired as a result of passive capital spending by some 71% of the sample firms. And it was notable that the very small firms were far more guilty of this approach than the larger companies.

LONG TERM INVESTMENT PLANNING Very few firms used likely future indicators as specific influences on their investment decisions, and many considered that no reliable indicators existed. Long term investment planning was nominal and the contribution such a policy could have made towards investment optimality was equally limited.

INVESTMENT DETERMINANTS AND INFLUENCES Investment was inspired mainly by necessity or circumstance which rendered capital spending imperative, provided that the funds were

availble. The majority of the firms appeared to be content to assume the role of "sleeper" rather than "thruster" as far as investment was concerned.

REFERENCES

(1) J. Stanworth and J. Curran, "Management Motivation in the Smaller Business", Gower Press, 1974.

(2) "Small Firms", Report of the Committee of Inquiry on Small Firms, Chairman J. E. Bolton, Nov. 1971, Cmnd. 4811, p 6.

(3) "The Why and How of Company Investment", Taylor Nelson Investment Services Research Article, The Director, Nov. 1970.

(4) A. Hankinson, "Investment, Price, and Output Decision Making in the Small Firm", (incorporating The Greater Manchester Study), M.Phil. thesis, Southampton Univ. 1974, (unpublished as at 1977).

(5) "Attitudes in British Management", A P.E.P. Report, Penguin Books, Harmondsworth, 1966.

CHAPTER 4

INVESTMENT FINANCE STRATEGY

CHAPTER 4
INVESTMENT FINANCE STRATEGY

INTRODUCTION

Could the main sources of finance in small firms be identified? What difficulties, if any, existed in the raising of investment funds? Did firms resort to institutional facilities? Were there any reasons for firms' avoiding external finance? To what extent had the government influenced investment decisions? What did small companies require from governments? Had the control of credit by monetary policy been a satisfactory influence on investment? Similarly, had the manipulation of the minimum lending rate by the authorities been successful? And how effective had regional aid been in the promotion of finance for investment? In an attempt to ascertain if small firms optimised their investment finance, attention is now turned to the above areas.

SOURCES OF FINANCE

The Merrett Cyriax Survey (1), a research report for the Bolton Committee (2), found that in manufacturing industry, no less than 92% of the firms in their sample "had not been concerned in any attempt to obtain finance through financial institutions other than their local bank".

Three reasons were given for this: (i) firms did not seek finance because they did not need it; (ii) firms would not seek finance through ignorance, prejudice, or moral scruples (40% of the respondents felt that it was unethical to borrow capital) and (iii) firms could not obtain credit because they were not credit worthy. Merrett Cyriax concluded that self-financing remained the dominant financial characteristic of the small firm sector.

The Bolton Committee (2) found that bank credit formed the greater part of "external" finance for small firms (63% of the sample had overdrafts) and the use of bank credit appeared to increase with the size of the firm. Indeed, in the Plymouth Survey (3) this trend could be observed among the four employee groups (refer Table 4.1 below) but perhaps the sample here is rather too small for this to be totally meaningful. Incidentally, the Bolton Committee also found that fast growing manufacturing firms in their sample showed greater reliance on bank borrowing, a fast growing firm being defined as one in which sales grew during 1964-1968 by 15% or more per year at current prices. A slow growing firm was defined as one in which sales remained stationary, or declined, and these had had less recourse to external borrowing than the fast growers. Unfortunately, it was not possible to research this topic in the Plymouth Survey, being worthy of separate testing in itself.

In the Plymouth Survey, the majority of the firms had used banking facilities for investment purposes when their own, or private, funds had been inadequate, the following table merely reflecting the recent most heavily relied upon sources of finance, i.e. the current trend which could have been influenced by the 1975 economic uncertainty and conditions.

Table 4.1 Recent Most Heavily Relied Upon Source of Finance. Plymouth Survey

Source of Finance	Employee Groups 0-24	25-99	100-199	200+	Totals
Own funds via profit	12 (46%)	8 (45%)	5 (42%)	2 (22%)	27 (41%)
Parent Co. or Group	3 (12%)	1 (5%)		3 (33%)	7 (11%)
Bank loans	6 (22%)	5 (29%)	4 (34%)	3 (34%)	18 (28%)
Hire purchase	1 (4%)	1 (5%)	1 (8%)		3 (5%)
Debenture stock		1 (5%)	1 (8%)		2 (3%)
Owners' and private loans	2 (8%)	2 (11%)	1 (8%)		5 (8%)
Other "external" funds	1 (4%)			1 (11%)	2 (3%)
Finance companies	1 (4%)				1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 59

Some firms had obtained funds from the parent company or group, but whether this had, in turn, been provided externally, was difficult to establish. Practically all the firms, as far as could be gathered, had a bank overdraft, but this was considered to be normal business practice, and did not compare with the acquisition of funds from the various other institutions. Firms with overdrafts did not really consider themselves to be financially committed since by implication the debt would be extended and repaid on a continuous basis. Thus, the tendency was to resist outside pressure or control, and this was regarded as important by the respondents. It seemed reasonably apparent that a large part of the firms' long term finances for investment had been provided by owners' cap-

ital, profits, and private loans, with bank support a seemingly rising influence with the size of firm. The following extracts certainly add weight to this proposition.

"Funds have been provided from profits and the parent company, with continuous bank overdraft support". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 59).

"The decision to invest is made here and is then (usually) approved by group if own funds are available. External finance would be considered if the capital item were vital". (P2; 95; D; FDT; Brewing; PSQ,Q59).

"Very little investment has taken place but when it has our own funds have been used plus bank credit where appropriate". (P3; 50; C; FDT; Confectionery; PSQ,Q59).

"Investment would normally be facilitated by bank overdrafts which in turn depend on profitability". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q59).

"Routine capital spending would be financed by our own funds with bank overdrafts in support". (P6; 450; D; FDT; Meat; PSQ,Q59).

"Any investment undertaken would be paid for in cash from reserves. We have no overdraft, hire purchase, leasing, or credit of any kind". (P7; 20; C; FDT; Minerals; PSQ,Q59).

"We have always raised our own funds for investment purposes, but the group presumably uses outside finance". (P8; 300; C; FDT; Bread; PSQ,Q59).

"There has hardly been any investment recently, and thus no claim on our finances has occurred, apart from the usual bank overdraft normally regarded as working capital". (P9; 15; D; CAI; Fertiliser; PSQ,Q59).

"Our main source of finance has been our own funds via parent and bank overdraft. But investment has never been on a large scale locally". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q59).

"No funds for investment have been employed beyond our own ploughback profits, bank loans, and overdrafts". (P11; 124; C; MME; Valves and Cylinders; PSQ, Q59).

"Investment has been financed by our own funds, reserves, directors' capital, bank loans, overdrafts, and some hire purchase". (P13; 170; B; MME; Steelwork; PSQ,Q59).

"Funds have been obtained from our own reserves, banks, and the parent company (U.S.A)". (P14; 468; B; MME; Machine Tools; PSQ,Q59).

"An overdraft system is favoured only if the debt is constant or reducing. In any event, our own funds are preferred for all investment. We have never approached the institutions, e.g. I.C.F.C., but have used a local finance company (during bank credit squeeze) at an above average rate of interest". (P15; 14; B; MME; Industrial Signs; PSQ,Q59).

"We always employ our own funds for capital spending plus a small amount of bank credit if necessary". (P16; 10; C; MME; Press Tools; PSQ,Q59).

"A recent £65,000 investment consisted entirely of our own funds. A bank overdraft is not really regarded as external credit here". (P17; 90; C; MME; Packaging Machinery; PSQ,Q59).

"Our main sources of investment finance are profits, plus occasional bank support". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q59).

"Whether investment is financed by the company or by the bank, profitability is crucial in both cases". (P19; 60; B; MME; Boats; PSQ,Q59).

"The firm has traditionally used its own funds on a total ploughback basis for all capital expenditure, but bank overdrafts and loans have occasionally supported this policy". (P20; 120; B; MME; Luxury Boats; PSQ,Q59).

"The company prefers to provide its own funds for investment, apart from the usual bank overdraft not regarded specifically as external credit". (P22; 21; B; MME; Boats; PSQ,Q59).

"The firm has a perpetual bank overdraft to cover

current losses, and only miscellaneous investment, e.g. repairs and maintenance, is being undertaken". (P23; 50; B; Iron Castings; PSQ,Q59).

"We have used several sources of funds for our recent investments, e.g. U. K. banks, eurodollars, parent company (U.S.A), and our own profits which influenced the borrowing terms. We have had no use of the I.C.F.C., F.F.I., etc., to date". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q59).

"When funds have been available from profits then investment has been considered. Bank overdrafts are used for normal working operations and are not regarded as specific loan finance". (P26; 70; A; MME; Trawler Repairs; PSQ,Q59).

"Investment has been paid for by bank facilities, ploughback, and some private capital pre 1972". (P28; 4; B; MME; Aluminium Castings; PSQ,Q59).

"We prefer to use our own funds for investment but recently profits have been low during the conversion from one product to another. The banks have helped along with some assistance but we have never used external finance". (P30; 30; B; MME; Ford Engine Conversions; PSQ,Q59).

"Although our own funds are preferred, bank overdrafts have been a major source of investment finance. But in any event, capital spending has been nominal. We have had no real need for institutional credit, and in fact, we are unaware of the procedure for obtaining such funds". (P33; 3; A; MME; Boats; PSQ,Q59).

"Investment is likely to proceed if company finance is available. Bank credit has been employed, but we prefer this to be kept to a minimum". (P36; 122; C; EE; Communication Equipment; PSQ,Q59).

"Occasionally, private injections of cash have financed necessary investment since we prefer not to rely too heavily on the banks". (P38; 8; B; EE; Control Panels; PSQ,Q59).

"The policy is for our own funds to be at a particular level as a contribution to group investment. The company's own funds are always preferred; a tradition going back to the family business days. We have no real objection to outside funds in theory, but equally, we have never experienced the consequences of such a policy". (P39; 800; D; TLCF; Footwear; PSQ,Q59).

"We have employed our own funds, debentures, and banks for our capital expenditure, but beyond these sources we are reluctant to proceed". (P40; 158; B; TLCF; Clothing; PSQ,Q59).

"If company funds or bank credit is not available then investment is postponed if important, and cancelled if it is not". (P42; 26; D; TLCF; Naval Uniforms; PSQ, Q59).

"Investment has been financed by reserves, overdrafts, and loans raised privately by the company". (P45; 23; C; BPG; Pottery; PSQ,Q59).

"Currently, we have no excessive need for investment finance since the prospects are rather poor. But normally we would employ our own funds with bank support for the larger project". (P47; 13; B; BPG; Pottery; PSQ, Q59).

"Traditionally, we have always used our own funds for capital items with some hire purchase and some leasing which offers some tax concessions. But we have never employed external sources apart from bank overdrafts". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q59).

"The firm's limited investment requirements are supplied by the owner and a 90% bank overdraft". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q59).

"No outside funds have been used for capital expenditure apart from some regional aid for the new factory in 1972". (P52; 22; D; OMG; Coffins; PSQ,Q59).

"Investment has been financed by the firm's own funds as a policy, but the banks have been approached on specific occasions, e.g. when the new extra floor was fitted. Generally, large amounts of investment finance have not been required". (P54; 24; B; OMG; Printing; PSQ,Q59).

"We have always used company reserves for investment built up from profits over the years, except for the new factory, when bank credit provided $\frac{2}{3}$ of the cost at $9\frac{1}{2}\%$. But this was our only major investment since 1920". (P55; 25; A; OMG; Vehicles; PSQ,Q59).

"The bank has provided £31,000 over the past two years for essential modern equipment, but this credit was based upon a satisfactory profit record and potential". (P56; 50; B; OMG; Printing; PSQ,Q59).

"We are against excessive credit for any purpose even if it is potentially profitable". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q59).

"The company's own funds and bank facility have been the main sources of funds for investment. We prefer to avoid excessive credit as a rule". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q59).

Without doubt, firms preferred to use their own funds for investment purposes. Indeed, some companies were emphatic about rejecting excessive credit even if potentially profitable. Others pointed out the importance of profit or "track record" if bank facility had to be resorted to. Practically every firm had had an overdraft at some time or other, which, as already made clear, was not normally regarded as outside finance.

Why did the firms reject the principle of external funds? Were firms aware of the application procedure for institutional finance, e.g. P33? Why did they, in the main, prefer not to incur excessive credit even though possibly profitable? Was this negative attitude based on difficulties in the past of raising such funds? The Plymouth firms were asked to give this issue some consideration which appeared to be important in view of the Bolton Committee's (4) finding that firms which had relied upon bank finance had grown faster than those which had not used this source, or had used it to a lesser extent. And, of course, it was important in the sense that this reluctance to employ bank credit was likely to impair the optimality of investment levels and investment returns.

DIFFICULTIES IN RAISING INVESTMENT FINANCE

Interviewees were asked to recall the difficulties, if any, which had been experienced in the raising of funds

for investment purposes, and Table 4.2 below summarises the main responses.

Table 4.2 Assessments of the Degree of Difficulty in the Raising of Investment Finance. Plymouth Survey

Extent of Difficulty Experienced	Employee Groups 0-24	25-99	100-199	200+	Totals
No major difficulty to date	11 (43%)	7 (38%)	4 (33%)	2 (22%)	24 (38%)
Some difficulty with large amounts or little difficulty with small amounts	4 (15%)	2 (11%)	2 (16%)	2 (22%)	10 (15%)
General difficulty e.g. new firm, low profits, etc.	4 (15%)	2 (11%)	3 (25%)	1 (11%)	10 (15%)
No difficulties if good profit record	3 (11%)	4 (22%)	3 (25%)	2 (22%)	12 (19%)
Funds easily raised		1 (6%)			1 (1%)
Little difficulty if investment vital				2 (22%)	2 (3%)
Some difficulty if seasonal trade	2 (8%)	1 (6%)			3 (5%)
No difficulty on trade cycle upturn	1 (4%)	1 (6%)			2 (3%)
Some difficulty if funds for experimental work	1 (4%)				1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires, Question 60.

An intersting statistic in the table concerns the firms which claimed to have experienced no major difficulties when raising finance. It would appear that the problem intensifies with the size of the firm. But it should be noted here that many of the smaller units qualified their statements by admitting that no large scale investment programme had been undertaken and consequently the need for excessive capital finance had been equally nominal. Nevertheless, nearly 40% of the sample claimed to have no real problems when raising investment funds. Was there a limit to this "success"? Could firms have raised additional finance and, provided that the investment was basically sound, reaped the profits? Were firms in favour of utilising bank credit for future returns? The table offers some possible answers, but we have to examine the individual statements which follow for a real insight into this area.

A smaller percentage of the firms had had some difficulty, but for individual reasons, e.g. new firm becoming established, regionalism, the economic situation, seasonal trade effects, finance for experimental necessity, and so on. But a significant result, reinforcing earlier findings, was that a good profit record was the real key to the raising of credit. Nvertheless, many of these firms would always prefer to use their own funds rather than resort to any form of external finance. Some general comments on this issue are reproduced below.

"We have had no difficulties to date in the raising of finance for investment purposes. Group H.Q. has supplemented our own funds when the occasion arose, but this source has never been regarded as external". (Code P1; Employees 486; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 60).

"Investment funds have been raised on our own

merit in the past, but recently we have had group backing who may resort to external funds from time to time". (P2; 95; D; FDT; Brewing; PSQ,Q60).

"We have experienced no particular problems to date. A new plant extension is necessary and presumably funds could be raised for this in the usual way, e.g. bank support". (P3; 50; C; FDT; Confectionery; PSQ,Q60).

"There has been little difficulty in the acquisition of finance provided that the investment was of some importance". (P4; 600; D; FDT; Baby Food; PSQ,Q60).

"Our investment activity has been rather limited over the years, and large amounts of finance have not been required. If excessive sums were needed, then problems presumably could arise". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q60).

"Banks are aware of our seasonal problems and accept them, but they do tend to be over-cautious when demands are above average". (P6; 450; D; FDT; Meat; PSQ,Q60).

"We have had no difficulties to date with funds for investment. One reason for this is that we have reached a level of operation that suits us, and no excessive credit is required. For example, there is little point in expanding. Transportation is costly and the product is heavy to move long distances although there would be a market further afield. Basically, we have remained content with the Plymouth area". (P7; 20; C; FDT; Minerals; PSQ,Q60).

"Capital finance has to be approved by group. We have tended to overstate our requirements as a precaution. This has sometimes had the result of slowing down the flow". (P8; 300; C; FDT; Bread; PSQ,Q60).

"There have been no real problems regarding investment finance to date due mainly to no excessive investment being undertaken as a result of the high cost of borrowing". (P9; 15; D; CAI; Fertiliser; PSQ, Q60).

"Local investment could be backed by the parent if necessary but generally credit has been difficult over the recent past". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q60).

"Finance, including overdrafts, is always more difficult to obtain if occasional losses are sustained". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q60).

"If credit has not been available, then the investment has simply been postponed rather than cancelled". (P12; 8; C; MME; Injection Moulds; PSQ,Q60).

"Generally, borrowing costs are too high and easily exceed our rate of return on capital. And there are no prospects of funds being raised within the firm. These constitute the difficulties". (P13; 170; B; MME; Steelwork; PSQ,Q60).

"The only difficulty in the raising of investment funds is lack of profit. But we have never approached the institutions". (P14; 468; B; MME; Machine Tools; PSQ, Q60).

"Investment capacity and facility have been relatively small, and the bank has been able to supply the funds. But if a large commitment were necessary then it could be far more difficult". (P15; 14; B; MME; Industrial Signs; PSQ,Q60).

"The firm's own cash has always been used for all investment except for a brief bridging loan provided by the bank to take over the new factory". (P16; 10; C; MME; Press Tools; PSQ,Q60).

"We have had no investment finance problems to date. If credit becomes tight then we merely cut requirements". (P17; 90; C; MME; Packaging Machinery; PSQ,Q60).

"Some difficulty can arise when banks fail to appreciate seasonal problems and lose confidence in future profitability". (P19; 60; B; MME; Boats; PSQ,Q60).

"Finance for capital items has rarely been raised in the conventional manner, e.g. by I.C.F.C. We have traditionally preferred to employ our own funds". (P20; 120; B; MME; Luxury Boats; PSQ,Q60).

"Being a small firm in a seasonal trade can be a disadvantage regarding investment finance. But if the demand for funds is moderate then few problems are encountered". (P22; 21; B; MME; Boats; PSQ,Q60).

"Investment finance can usually be raised provided that profitability is apparent, but currently profits tend to be depressed, e.g. by excessive taxation". (P23; 50; B; MME; Iron Castings; PSQ,Q60).

"Any difficulty experienced can usually be attrib-

uted to the lack of profitability, being in a development area, and government inaction regarding inflation". (P24; 200; C; MME; Toolmaking; PSQ,Q60).

"We have had no difficulties raising investment funds to date, but if the economic climate worsened and confidence fell leading to reduced profits, then the position could easily change". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q60).

"Currently, there is the problem of attempting to raise funds for capital items with an unstable profit record". (P26; 70; A; MME; Trawler Repairs; PSQ,Q60).

"No serious problems have been experienced with investment finance especially since the requirements have been modest". (P27; 40; D; MME; Thermowells; PSQ,Q60).

"Investment depends on market trends and therefore finance is more easily raised on the trade cycle upturn. But even so, simply being a small firm can inhibit the supply of funds". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q60).

"Some slight difficulty with investment funds can be levelled at our recent change of product and thus no history of success to back our applications". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q60).

"Very few investment finance problems have been experienced but very little major investment has taken place". (P31; 50; B; MME; Steelwork; PSQ,Q60).

"Investment finance needs have been nominal and the problem of funds has not arisen. However, we would expect some problems if a large injection were required". (P33; 3; A; MME; Luxury Yachts; PSQ,Q60).

"Being a new entry to the market with an unknown record of profit, together with the current inflation and uncertainty, has generated certain problems regarding the raising of funds for capital expenditure". (P36; 122; C; EE; Communication Equipment; PSQ,Q60).

"Recent borrowing has been difficult possibly due to our being a new firm, poor profit record, and the absence of a market hinterland in the South West". (P37; 27; C; EE; Location Systems; PSQ,Q60).

"Investment finance has been affected by our cur-

rent low profits, but a government contract has helped to counterbalance this". (P38; 8; B; EE; Control Panels; PSQ,Q60).

"If investment is regarded as crucial then funds tend to be found". (P39; 800; D; TLCF; Footwear; PSQ,Q60).

"If profits are low or tend to fluctuate then credit problems arise. In any event we prefer to use our own funds for all investment". (P41; 150; C; TLCF; Clothing; PSQ,Q60).

"There has been no outstanding finance problem over the years, but government fixed contracts have ensured a good credit rating". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q60).

"Capital expenditure finance problems have been minimal since investment undertaken has been limited, e.g. the factory building is rented, and the main spending has been on repairs and maintenance". (P44; 45; D; BPG; Glass; PSQ,Q60).

"The main problem of raising investment finance rests with reconciling the fluctuations of seasonal demands for the product, with the fixed credit entitlements agreed with the banks". (P45; 23; C; BPG; Pottery; PSQ,Q60).

"No major investment finance problems have arisen, but there has been no need for large sums and we prefer to avoid credit as a policy". (P48; 25; C; OMG; Furniture; PSQ,Q60).

"The only problem with finance for capital expenditure is the technical one of choosing between overdrafts, loans, hire purchase, and using our own funds". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q60).

"Investment finance problems have been nil if one considers it from a limited requirements angle". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q60).

"Investment has not been on a large scale but the recent lack of our own funds has presented some problems". (P53; 20; C; OMG; Furniture; PSQ,Q60).

"There have been no major difficulties regarding the raising of funds for investment due mainly to a low scale capital expenditure programme over the years. The new factory was bank financed, but even here the firm

provided 33⅓% of the cost". (P55; 25; A; OMG; Vehicles; PSQ,Q60).

"A large sum is required for urgent modernisation, but since profits are currently low, negotiations are likely to be difficult". (P56; 50; B; OMG; Printing; PSQ, Q60).

"The lack of adequate profit can be significant when attempting to raise investment finance. In any case, we prefer to keep credit to an absolute minimum". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q60).

"Under normal conditions there would be no real problems of finance if the investment were vital and the outlay not excessive. But heavy credit would be avoided as a policy". (P59; 175; D; OMG; Concrete; PSQ,Q60).

"As the firm has grown larger the investment finance problems have seemed to ease. Presumably, the smaller and growing firms, whose requirements could exceed their credit worthiness, experience the difficulties". (P62; 400; C; OMG; Business Systems; PSQ,Q60).

"No large scale investment has been undertaken, and excessive bank credit would be avoided in any event. Thus, there have been few real problems. But finance for experimental work has tended to be difficult to obtain from time to time". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q60).

"Problems have arisen from our low profitability over the past few years which has affected borrowing powers and possible investment. Large amounts of capital finance have not, however, been required". (P65; 30; B; OMG; Tents; PSQ,Q60).

For many of the firms finance was usually available for investment purposes from outside sources, but they seemed most reluctant to take advantage of it. A small number of respondents criticised the banks for failing to appreciate seasonal problems, and others felt that these institutions should only be approached as a last resort.

A number of companies believed that if a major investment were undertaken and a large outlay was involved, then real problems of raising the finance would emerge,

especially since borrowing powers were strongly related to profitability rather than performance potential.

Undoubtedly, many of the firms could be criticised for their non-positive approach to investment finance. Loan finance does not necessarily lead to losses, and indeed, would most likely promote profitability if the investment and the facility had been accorded the usual careful considerations beforehand. Several companies, in fact, outlined opportunities for expansion and improvement, but still preferred the status quo. Some visionary investment via the institutions could well have taken advantage of the very opportunities identified by the firms themselves. Levels of capital expenditure (and the eventual investment returns) were seemingly falling short of optimum. What exactly were the reasons for the firms' reluctance to resort to institutional finance, possibly at the expense of profitability? Attention may now be focussed specifically on this question.

EXTERNAL FINANCE

Generally speaking industry has faced an investment dilemma over the years. The private small firm sector, often criticised for perennially low investment appeared to require more and more official encouragement before undertaking further fixed capital formation. Plymouth Survey firms, however, felt that the lessons of stop-go since 1945 had taught that a cautious approach to investment was often preferable to an immediate response to government exhortation or provision of investment funds. And as already pointed out in Chapter 3, even buoyant demand and reflationary economic conditions did not always lead to increased short run investment.

The government's reaction to the resulting fall in investment intentions has tended to be twofold. The first is covered by the view that if private industries will not invest, then the government must do it for them. This belief finds its embodiment in such enterprises as the National Enterprise Board, but the Plymouth firms considered such institutions further reduced business confidence and were consequently counter-productive.

The second reaction concerns incentives in annual budgets, and the provision of £1,000 million of funds by the newly created (1975) Finance for Industry organisation. Indeed, apart from the problem of the lack of will to invest, there has always been the lack of means difficulty.

By tradition the local bank has always lent short term and, in theory, an overdraft is so regarded. More recently, however, practice has differed from theory, and to an increasing extent, long term investment has been influenced by the rather doubtful practice of carrying over short term borrowing. Finance for Industry is aimed at least in part at rectifying this situation.

These points were raised and discussed during the course of the Plymouth Survey interviews, and the following additional aspects were also covered as a matter of general interest. Since it appeared that not all firms were aware of the facilities available, asummary of some external sources of finance was provided for them as follows.

Dominating the venture capital market was the Industrial and Commercial Finance Corporation which as at 1975 had £225 million committed in more than 2,300 companies (5). Started in 1945 by the clearing banks it would invest sums as low as £5,000 and also take a longer term view of growth than other banks or backers. The I.C.F.C. also administered in Britain loans granted to small firms

in development areas under E.E.C. policy. It had a countrywide network of branches and funds from seven to twenty years, but only about one in forty of its investments was purely start-up capital.

Although it did not make loans on a general basis the Department of Industry also helped small firms to set up in assisted areas.

Another government backed source of finance was the Council for Small Industries in Rural Areas. With a ceiling of £30,000 and a lower limit of £250 for up to 20 years C.O.S.I.R.A. would provide up to 80% of finance for an individual industrial service, or tourist related project in a rural area or town of not more than 10,000 population. Loans were made for building, purchase of plant and equipment, and working capital. For new businesses C.O.S.I.R.A. would probably ask for a feasibility study of the project.

Thus, as was pointed out, there was no shortage of external finance sources, and the foregoing was by no means complete. But it was very soon in evidence that the Plymouth Survey firms did not, in the main, resort to these funds. Indeed, the impression was that external finance was to be avoided. Why was this the case, when outside finance could have led to profit? The following paraphased extracts offer some light on this issue.

"We have not employed external funds since there has been no outstanding need. We are not familiar with the F.F.I., etc., but believe that our credit rating would secure finance if required". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 61).

"Large amounts of investment finance have not been required, but in any event, we would prefer to remain independent of outside control". (P2; 95; D; FDT; Brewing; PSQ,Q61).

"Fortunately, external funds have not been required to date. Would certainly oppose any measure of outside interference if such finance were considered". (P3; 50; C; FDT; Confectionery; PSQ,Q61).

"We have always preferred to employ our own funds and if the parent company supplied finance we would regard that as internal". (P4; 600; D; FDT; Baby Food; PSQ, Q61).

"No exceptional investment needs exist; not aware of the F.F.I; and probably the firm's credit rating is inadequate". (P5; 120; D; FDT; Medicated Pastilles; PSQ, Q61).

"External finance has not been required and we have not considered expanding the firm on credit at a cost which would conceivably be lower than the returns". (P7; 20; C; FDT; Minerals; PSQ,Q61).

"Would certainly not accept a 10% outside control as part of the agreement regarding external finance". (P8; 300; C; FDT; Bread; PSQ,Q61).

"Parent funds have usually been sufficient for investments. The policy has been to avoid external credit and the high cost involved. Additionally, we have always rejected high gearing". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q61).

"Large scale funds are not absolutely necessary. We would consider the institutions, but only as a last resort". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q61).

"There has been no real necessity for external funds to date, apart from the original borrowing for basic plant and machinery which was obtained from the local bank. Not familiar with the work of the F.F.I., etc". (P12; 8; C; MME; Injection Moulds; PSQ,Q61).

"The institutions charge 18% on loans plus, say, a 10% control. Both conditions are unacceptable". (P13; 170; B; MME; Steelwork; PSQ,Q61).

"We have never used institutional finance for investment despite the profit potential, because external control could not be entertained. In any case, the F.F.I. is for large companies". (P14; 168; B; MME; Machine Tools; PSQ,Q61).

"There has been no pressing demand for external finance but we would probably avoid it anyway in order to minimise outside control". (P15; 14; B; MME; Industrial Signs; PSQ,Q61).

"No need to approach the institutions; not familiar with the F.F.I; and would, in any event, always reject measures of external control". (P17; 90; C; MME; Packaging Machinery; PSQ,Q61).

"The firm might consider external funds if required, but only as a last resort". (P19; 60; B; MME; Boats; PSQ, Q61).

"Large scale investment finance has not been required to date beyond that suppliable by the bank. Would not welcome external interference and neither would the parent company". (P20; 120; B; MME; Boats; PSQ,Q61).

"The possibilities of raising investment funds externally have not been explored for various reasons, e.g. are we sufficiently credit worthy?" (P23; 50; B; MME; Iron Castings; PSQ,Q61).

"External funds have not really been required on a significant scale but we would prefer to use our own finance anyway to avoid external interference. In any event, borrowing is too expensive and committing, and we would very likely approach the parent company in an emergency". (P24; 200; C; MME; Toolmaking; PSQ,Q61).

"Not sure why the institutions have not been used but we have employed E.C.G." (P25; 385; A; MME; Paper Converting Machines; PSQ,Q61).

"In order to avoid excessive outside control we would choose to postpone the investment rather than resort to institutional credit". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q61).

"Some outside finance has been used but the policy has always been against large external commitments". (P34; 20; B; EE; Cold Rooms; PSQ,Q61).

"We have tried to avoid all forms of outside interference especially in the early stages of the company's life. Independence has been highly valued". (P36; 122; C; EE; Communication Equipment; PSQ,Q61).

"Currently, we would prefer to avoid further debt even if likely to be ultimately profitable". (P38; 8; B; EE; Control Panels; PSQ,Q61).

"We have no real objection to external investment funds but we have never experienced the consequences of offering, say, a 10% control to the institution in question". (P39; 800; D; TLCF; Footwear; PSQ,Q61).

"Would consider institutional finance but only as a last resort since it tends to be no cheaper than conventional bank finance and invariably involves a measure of external control". (P41; 150; C; TLCF; Clothing; PSQ, Q61).

"We are aware of the work of the I.C.F.C., and the F.F.I., but especially we are aware of the degree of external control involved. The firm has always ruled that the board comprise, in essence, of works personnel and not outsiders". (P44; 45; D; BPG; Glass; PSQ,Q61).

"Not too familiar with institutional finance for investment purposes and have not considered usage. But it might be profitable and the expertise valuable". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q61).

"Generally, we would not be happy about possible control demanded. In any event, the firm is probably too small with an inadequate credit rating for the funds required. Outside finance could conceivably ease our investment problems but we have not really examined the possibilities". (P51; 3; B; OMG; Ceramic Transfers; PSQ, Q61).

"External finance for investment purposes has not been required but even if the opposite had been the case we would not have proceeded if a 10% control had been demanded. The I.C.F.C. would probably call for the cutting out of certain non-profitable operations, e.g. service to customers, etc". (P54; 24; B; OMG; Printing; PSQ, Q61).

"Not really aware of the F.F.I. or the I.C.F.C., but presumably we would consider such funds as a last resort". (P56; 50; B; OMG; Printing; PSQ,Q61).

"We have no objection to outside funds for investment but have never actually employed them. Generally, we would prefer to raise finance from our own reserves or by the use of hire purchase or even leasing". (P60; 106; C; OMG; Building Materials; PSQ,Q61).

"There has been no pressing need for large sums for investment purposes, and the I.C.F.C., etc., have never been approached. We are not familiar with their

operations or the procedure of enquiry, but we are aware of their board representation requirements and this would be unacceptable". (P65; 30; B; OMG; Tents; PSQ,Q61).

As previously noted, firms did not regard bank overdrafts as external funds, and this has been accepted in the preparation of the following table which summarises the foregoing responses. An outstanding feature of the table, and the extracts, was that 95% of the Plymouth Survey firms had not been concerned in any attempt to obtain finance through facilities beyond the local bank or other subsidiary sources. It will be recalled that the Merrett Cyriax Survey (6) also found similarly with a 92% response.

Table 4.3 Dominant Reasons for Avoiding External Funds for Investment. Plymouth Survey

Reasons	Employee Groups				
	0-24	25-99	100-199	200+	Totals
External funds employed or considered	1 (4%)		1 (8%)	1 (11%)	3 (5%)
Not required. Have used (or would use) own funds	9 (35%)	6 (33%)	4 (33%)	3 (33%)	22 (34%)
Avoidance of outside control	8 (31%)	5 (28%)	4 (33%)	3 (33%)	20 (30%)
Avoidance of high gearing and heavy interest drain on profit. Too inconvenient or committing	1 (4%)	2 (11%)	1 (8%)	1 (11%)	5 (8%)

Table 4.3 (Continued)

Reasons	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Currently unaware of institutional sources, procedures, credit worthiness, etc	6 (23%)	5 (28%)	2 (17%)		13 (20%)
Parent sources				1 (11%)	1 (1%)
No external funds employed regardless of profit potential	1 (4%)				1 (1%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 61

Some 34% of the sample claimed that they had not really required external finance, and in any event, would have used their own funds or overdrafts. About 30% felt that they should avoid external credit in order to preserve a measure of independence, believing that outside finance was synonymous with outside control. In fact, a large number of the firms made this point and must be regarded as a major reason for the rejection of external funds. But 30% were particularly trenchant on this issue. Yet surprisingly, only 8% considered that external facilities would be too expensive, somewhat inconvenient, and unduly committing. Regretably, about 20% of the sample (mainly the smaller firms) were "not too familiar" with institutional sources, procedures, or their own credit standings.

A further notable point was that the table was

remarkably consistent in the responses over the four employee groups.

The Bolton Committee (7) felt that many small firms would have been eligible for finance if they had applied. Many firms chose not to do so. Could profits have been increased if external funds had been used for investment? There is little doubt that the institutions ensure that a venture is profitable before funds are made available, and especially if a 10% control is undertaken. Thus, one might reasonably infer that profits were being lost by firms' refusals to resort to these funds. In other words, firms appeared to be content with an investment finance situation that could conceivably have contributed to sub-optimum investment levels, and sub-optimum investment returns.

ROLE OF GOVERNMENT

In a rigorous examination of the state of British industry as at January 1975, "The Sunday Times Business News" (8) sounded chairmen of Britain's biggest companies asking about the prospects for profitable investment in that year. More than 50 responded and their views, possibly representative of smaller concerns, were backed by the weight of more than two million employees, and over £12,000 million of capital employed. And their collective assessment was pessimistic. Asked about 1975 capital expenditure, one chairman replied: "None at all". The problems cited ranged from finance to politics, but a recurring theme was uncertainty and the lack of government action. Most chairmen seemed to be willing to settle for <u>any</u> government that would lay down a set of rules and retain them. Undoubtedly, the government was expected to have a dominant

role to play in the promotion of investment, and investment funds. A selection of responses is presented as follows.

"Mainly as a result of cost increases, our working capital requirements in 1974 absorbed the equivalent of all cash flow normally available for new investment. It is difficult to foresee any appreciable new investment until there are positive signs of inflation abating, interest rates falling, and reasonable freedom from government price control". (Joe Thorley, Chairman, Allied Breweries).

"Frankly, we are not looking for acquisitions in Britain in the present economic climate, although we realise that there are many available at well below asset value. However, we feel that there are better returns to be obtained overseas while government policy here is continually subject to fiscal changes". (Norman Castle, Chairman, Berisfords).

"Looking at the British economy as a whole, we can see no area which offers any real scope for new investment. Perhaps the single most devastating factor is that despite the concessions on stock profits which may or may not be continued, businesses continue to be taxed by governments at a high rate on reported profits which at best are barely sufficient to finance current maintenance and modernisation, to say nothing of expansion, and at worst are not real profits at all". (Richard Dobson, Chairman, B.A.T).

"Cost and wage inflation coupled with government price controls eat into profits, adversely affecting our ability to generate enough cash for new investment. We have to live within the resources available to us, and the price of doing so is the postponement or cancellation of all but the most clear-cut short term investment". (Sir Humphrey Prideaux, Chairman, Brooke Bond).

"Investment in the U.K. operations of our company must be lower in 1975 than in 1974 because of the combined effects of the present rate of inflation and of price control. A gross return of at least 31% is required if the investment is to pay its way. In addition to which an allowance must be included to cover the risk that the anticipated return will not be achieved because of government action". (Adrian Cadbury, Chairman, Cadbury).

"To avoid involuntary government nationalisation and to protect the longer term equity value of shareholders, cash conservation is the prime necessity. In the case of many companies I would imagine financial examination will be more largely centered on the economies of disinvestment, particularly in terms of cash release". (Charles Bell, Chairman, Coats Patons).

"With the size of North Sea investments, the oil industry needs better quantification of its risks before investment commitments can be made. Clearly stated policies with government commitment to a period of stability are essential". (Austin Pearce, Chairman, Esso).

"The nature and spread of E.M.I's international business ensured our awareness of the deteriorating world situation in terms of business activity at an early date, and the apparent euphoria in the U.K. (at all levels from government to consumer) has been dangerously out of line with the international flow-back of information during the last six months or longer". (John Read, Chairman, E.M.I).

"Our group operates in the food industry, and when considering investment opportunities we are forced to place as much importance on attempting to anticipate possible arbitrary government attitudes, as on considering the commercial viability of a project". (George Cannon, Chief Executive, Fitch Lovell).

"We must remember the following. A manufacturer invests because of the potential market for his product and the probability of achieving satisfactory margins. With inflation and high interest rates, margins must be proportionately higher to provide a satisfactory cash flow to finance the investment and the rising costs of stock and work in progress. As costs rise, margins can be maintained only by introducing timely and adequate price increases. Unit costs can be kept down only is productivity is increased both from existing investments and new investments. Higher productivity is particularly an incentive for new investment if it cannot be achieved by better use of existing resources. If government shows its understanding of these basic facts and its willingness to help create the right environment for these conditions to be satisfied, then investment will follow". (Lord Nelson, Chairman, G.E.C).

"Unless the percentage rate of inflation is reduced to single figures by government, I believe that in-

vestment will fall substantially and this will have deleterious effects on the economy in the late 1970's and early 1980's". (Alex Page, Chairman, Metal Box).

"As long as we have a government that is clearly directed by Marxist principles, spinning deeper into a vortex of political introspection, and only paying lip service to free enterprise, the prospects for investment, never mind profitable investment, are minimal". (Sir John Clark, Chairman, Plessey).

"What we need are firm government policies - clear short and medium term guidelines which one could assume would remain essentially valid for a reasonable time, say two to three years. Of course, these guidelines might not exactly accord with the views of industry. But we would then know where we were and plan accordingly". (Wisse Dekker, Chairman, Philips Industries).

"It is very difficult indeed to see a rosy future for new projects. Obviously, we will continue to make investment to ensure our on-going business. We think that the existing price controls and the uncertainty of possible government action involving further interference with our liberties are the two factors which have the most bearing on investment plans". (Joseph Rank, Chairman, Rank Hovis).

"If we have to operate in the U.K. under ill-conceived government price controls, as we did all last year and are still doing to a certain extent, then we may have to scale down or defer our plans". (Arthur M. Mason, Chairman, Reckitt and Colman).

"Thorn normally produces a return on capital of 20% to 30%. At those levels we can even make money at today's colossal interest rates. But the big problem is on new investment projects. This cannot possibly expect to produce 15% or more in its early years. But in our view, at the present time, anything below 20% is looking for trouble". (Sir Jules Thorn, Chairman, Thorn).

"I would distinguish between investment designed to improve the efficiency, reduce costs, or marginally increase the output of an established business and investment in a new business or a major extension of capacity of an existing business. The first can be sufficiently profitable to be justified, at least on paper, even with present rates of inflation and cash shortage. The prospect for the second kind of investment is dismal. Anyone

considering investing in manufacturing assets which must earn an acceptable return over their useful life, say 20 years, must make judgements of the state over that period of the U.K. economy. The uncertainties involved are much more political than the ordinary commercial risks". (Lord Plowden, Chairman, Tube Investments).

"Since at present every other country seems to think that British policies are deeply self-wounding, labour, and particularly politicians should start to wonder whether the rest of the world is right. If we continue to live in our present state, then investment here cannot be a good long term bet". (Kenneth Thorogood, Chairman, T.K.M).

"The critical factors in our investment planning are the availability of funds, and return on capital. At the present time, we are particularly concerned with the great difficulty in making an adequate profit margin in many business sectors in this country. Although we have not had to stop or slow down any major project under way in the last six months, we are now having to apply very stringent criteria when considering whether new investment will yield an adequate return. And by adequate we mean substantially more than the rate of interest to cover the risks involved". (David Orr, Chairman, Unilever).

"Sales of beer are a barometer of the general economic climate, and depend on how much spare cash there is in the ordinary man's pocket. Were we to achieve equal volumes with last year, our present margins could still not sustain the capital investment upon which we had embarked. We have, therefore, cut back our capital investment programme to a level which we judge will be covered by the cash flow". (Frederick Bennett, Chairman, Whitbread).

"If the government permits industry in general to retain more of its profits for self-financing development then obviously in company with others we will be able to expand more rapidly in the years ahead". (Lord Robens, Chairman, Vickers).

Bearing in mind the above extracts, in 1975 Britain's 55 million population had a living standard in excess of that which could be met from the country's resources. To support this standard of living the U.K. imported more than £20,000 million worth of foreign goods, but exports paid

for only 75% of this. Even after crediting invisible earnings the deficit with the rest of the world stood at £3,730 million. This was more than three times the previous year's deficit, itself the worst ever recorded. Much of this deficit was accounted for by the cost of oil, but by no means all of it. The visible trade in goods other than oil had also been in continuous deficit since the middle of 1972.

While unavoidably dependent on imports for raw material, Britain and its industries had also become net importers of a wide range of manufactured goods. At the same time, British export earnings rose less than those of her rivals, e.g. U.K. exports to O.P.E.C. countries rose by 7½% compared with 19% for Germany, and 35% for France. During 1974 the rate of new export orders taken by British engineering companies fell by 25%, back to the average level for 1970.

The shortfall was generally made good by massive overseas borrowing. But at the same time resources had been switched from badly needed investment (down 5% since 1973) to immediate consumption (up by 2%).

The nub of the problem was that whatever the precise division of blame between management, labour, and government, British industry taken as a whole lacked the capacity and modern technology to play its full part in export markets. Inevitably, it became unable to finance the level of consumption. Clearly, a total investment spending programme of some £20,000 (9) over 10 years well planned and carefully implemented did not seem more than the situation required. But in the light of the foregoing comments from Britain's top chairmen, <u>how</u> could this be brought about? Industry seemed most reluctant to take the initiative. The impression was that the government had to set the pace.

But to what degree did small firms react to government decisions? The Plymouth Survey firms were asked to appraise their reactions to changes in government policies. For example, to what extent was investment decision making adversely affected by government policy, and what did small firms expect of government? How did changes in the minimum lending rate and credit availability impact on investment finance decisions? And importantly, how were investment decisions influenced by regional aid? Attention may now be focussed on these issues.

GOVERNMENT INFLUENCE ON INVESTMENT DECISIONS

If Britain's larger companies had implied that government initiative was imperative for an investment recovery, the smaller firms in the Plymouth Survey tended to temper this view in relation to their size. Table 4.4 below shows that investment decisions were considered to be less influenced by government intervention in the smallest units, whilst the larger firms were the ones that gave higher priority of concern to the government's alleged contribution to the "lack of confidence". Surprisingly, the government's inability to curb inflation was somewhat overshadowed by this.

Excessively high corporation tax figured prominently as an influence on investment finance decisions in that likely funds were being taxed away unnecessarily. However, many firms made the distinction between short and long term investment decisions. Government policy in period "t" would probably not take effect until period "t+1" by which time the firm could have taken avoiding action. But this action may not necessarily have been in the best interests of the firm or the country as a whole. For example,

firms considering themselves over-taxed of likely investment funds merely postponed their capital spending. One company (P18) unable to obtain regional aid decided to rent the building rather than purchase. This decision was subsequently regretted in the light of worsening inflationary conditions during the period 1970-1975.

An interesting characteristic of the table was that 8% of the sample believed that an anti-small firm approach was generally adopted by governments, and again, this view predominated among the smallest units.

Firms had specific views on the problems posed by high minimum lending rates, credit availability, and regional aid, but these issues were excluded at this stage, and are covered in due course.

Table 4.4 Investment Decisions Most Adversely Affected by Government. Plymouth Survey

Investment Decisions Most Adversely Affected by Government:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Lack of action & confidence	3 (11%)	3 (17%)	2 (17%)	2 (22%)	10 (15%)
Price control policy	1 (4%)	1 (5%)	1 (8%)	1 (11%)	4 (6%)
Uncontrolled inflation	3 (11%)	1 (5%)	1 (8%)	1 (11%)	6 (9%)
High commodity tax	1 (4%)	1 (5%)			2 (3%)
High corporation tax	6 (23%)	5 (28%)	3 (25%)	3 (33%)	17 (26%)
Take-over possibilities and nationalisation	1 (4%)			1 (11%)	2 (3%)

Table 4.4 (Continued)

Investment Decisions Most Adversely Affected by Government:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Apparent anti-small firm approach	3 (11%)	1 (5%)	1 (8%)		5 (8%)
Doubtful priority of full employment policy			1 (8%)		1 (1%)
Political uncertainty	1 (4%)	1 (5%)			2 (3%)
Irrational regional contracts	1 (4%)	1 (5%)	1 (8%)	1 (11%)	4 (6%)
Administrative bureaucracy	1 (4%)	1 (5%)			2 (3%)
Lack of general information	1 (4%)	1 (5%)	1 (8%)		3 (5%)
Investment decisions NOT directly affected by government policies	4 (15%)	2 (11%)	1 (8%)		7 (11%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 53

Specifically, we should note that only 11% of the sample considered that government intervention in the areas covered in Table 4.4 had no direct effect on their investment decisions. If the majority did indeed, look to central government for leads, then what did they actually expect of government? Table 4.5 below, whilst by no means comprehensive, offers some indications.

EXPECTATIONS OF GOVERNMENT

The Plymouth Survey respondents were asked to state the most important area of improvement which the government could implement, and which might raise investment expectations. An ambivalent attitude could be discerned in that on the one hand firms had repeatedly valued their independent decision making capacity, e.g. by rejecting external finance and the possible measure of control, whilst on the other, they clearly expected some assistance from the authorities.

But this required assistance did not necessarily imply indirect monetary aid. A significant 54% of the sample reinforced the need for a restoration of confidence by the curbing of inflation, the abolition of price controls, and the reduction of corporation tax. And this feeling was spread remarkably evenly among the four employee groupings. Direct assistance was expected.

(Incidentally, there are a number of current changes affecting the direct taxation of business. One of the most significant is the decision to make stock relief a permanent feature of the tax system. On corporation tax the rate remains at 52%, but the profit levels up to which the small companies rate applies have been raised. If profits do not exceed £30,000 - previously £25,000 - the 42% corporation tax rate applies. Marginal relief is given if profits do not exceed £50,000 - this was previously £40000).

Moreover, some 26% demanded "industrial stability" by governments' laying down long term policies and persevering with them. This requirement too, was as strongly felt in the smaller firms as in the larger.

An ominously low 8% called for a more flexible regional aid programme, an issue developed more fully presently.

Another 8% hoped that the government would inter-

vene less, but this referred mainly to nationalisation threats, etc., rather than to investment finance.

Finally, only 1% of the sample called for a "more unified investment funds system", the vast majority, as noted earlier, preferring to employ their own rather than institutional finance.

Table 4.5 Expectations of Government
Plymouth Survey

Central Governments Should:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Raise confidence by curbing inflation, abolishing price control, and reducing corporation tax, etc.	14 (54%)	9 (50%)	7 (58%)	5 (55%)	35 (54%)
Promote a unified investment funds system to avoid over-reliance on banks, credit, etc.		1 (5%)			1 (1%)
Develop a more flexible regional aid programme	2 (8%)	1 (5%)	1 (8%)	1 (11%)	5 (8%)
Guarantee markets for small firms	1 (4%)	1 (5%)			2 (3%)
Intervene less, e.g. take-overs, nationalisations, promotion of artificial jobs for full employment policy	2 (8%)	1 (5%)	1 (8%)	1 (11%)	5 (8%)

Table 4.5 (Continued)

Central Governments Should:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Create industrial stability, e.g. set out policy and retain it	7 (27%)	5 (28%)	3 (25%)	2 (22%)	17 (26%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 57

The following representative selection of extracts are intended to support and facilitate the interpretation of Tables 4.4 and 4.5

INFLUENCE AND EXPECTATIONS OF GOVERNMENT

"Government action has been significant in that it has caused a general lack of confidence even in the normally predictable food trade. For example, taxation is too high, price control is inhibiting, and inflation renders forecasting impossible. The government should lower company taxation, offer price freedom, set and retain firm policies, and adopt more appropriate regional aid, e.g. applicable to the Plymouth area. The banks too, are not blameless; failing to appreciate seasonal problems, and the fact that our activity is inversely related to the economic situation". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 53, 57, & 58).

"Duty on beer is far too heavy a burden, and corporation tax stifles the means to invest. The government should abolish duty and leave the surplus for capital expenditure. Alternatively, the setting up of a unified system for investment finance at favourable terms should be considered". (P2; 95; D; FDT; Brewing; PSQ,Q53, 57, and 58).

"Government intervention has not affected us directly except that tobacco tax and price control has eroded

profitability which in turn reduces investment finance. What is needed is the raising of confidence generally by, for example, the government controlling inflation and permitting firms more freedom to retain what they earn". (P3; 50; C; FDT; Confectionery; PSQ,Q53, 57, and 58).

"High company taxation, price control, and inflation have been areas of intervention, or non-intervention, by government which have inevitably affected our investment decisions. The policy on take-overs could also be an issue. For example, our investment is independent of the parent company, but if acquisitions, mergers, etc., are promoted on a large scale by central government, then investment initiative at local level could disappear. Governments should encourage local investment freedom by offering flexible grants not tied to the creation of employment, since Plymouth tends to be short of labour. Additionally, there does seem to be an information gap regarding investment funds, e.g. the work of the F.F.I. is obscure". (P4; 600; D; FDT; Baby Food; PSQ,Q53, 57, and 58).

"We tend to observe market trends rather more than government activity, but the authorities could be more sympathetic towards the established firm. For instance, new American companies locating in the area are granted every financial facility whilst the existing local firms tend to be ignored". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q53, 57, and 58).

"The government seems to be against small firms in general, e.g. small shops disappear and supermarkets tend to deal exclusively with large companies. The authorities are not prepared to help small firms' investment to cover this loss of business by, for instance, lowering corporation tax, and removing V.A.T. from our product, the only non-alcoholic drink subject to this tax. The financial institutions are an irrelevance to us as we only invest if our own cash is available". (P7; 20; C; FDT; Minerals; PSQ,Q53, 57, and 58).

"Nationalisation tends to protect labour at the expense of profitability. Fears of nationalisation have inhibited longer term investment planning because if the industry were taken-over the Plymouth unit would be declared obsolete". (P8; 300; C; FDT; Bread; PSQ,Q53, 57 and 58).

"Government policy (subject to the nature and intensity) affects us more indirectly than directly. For example, if the government gave due consideration to farmers' problems this would react favourably upon this ind-

ustry. Incidentally, banks still tend not to understand seasonal problems". (P9; 15; D; CAI; Fertiliser; PSQ,Q53, 57, and 58).

"Our investment decisions are basically our own, but more financial freedom, e.g. lower company taxation, from government would obviously influence our capital expenditure planning. Probably too much is expected of government ability to implement change". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q53, 57, and 58).

"Full employment policy can be an influence on investment decisions in that mechanisation tends to be accorded low priority. The government should consider reduced taxation for selected small firms to compensate. To assume that I.C.I. has the same problems and advantages as small firms, and to tax them at the same rate is bound to lead to financial anomalies and investment inconsistency". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q53, 57, and 58).

"Investment decisions could be favourably affected if prices were freed, corporation tax reduced, inflation controlled, and government gave industry more freedom to make a satisfactory rate of return on capital". (P12; 8; C; MME; Injection Moulds; PSQ,Q53, 57, and 58).

"High taxation, price control, rising inflation, and high borrowing rates, have all contributed to low rates of return. The government should consider introducing concessionary borrowing rates of $2\frac{1}{2}\%$ as in Europe. Then results would follow. The Exchequer could claw back later. This, at least, would provide some incentive for small firms to invest. Also, a little more freedom for the banks, whose hands are tied by governments, would help. (Not aware of the 1971 'Competition and Credit Control' measures)". (P13; 170; B; MME; Steelwork; PSQ,Q53, 57, and 58).

"The U.K. machine tool industry is a vital one and preferential treatment would not have been unreasonable. Investment in automation is essential but the government has not helped in the encouragement of this, e.g. by guaranteeing finance and reasonable rates of return. A strong home based market is crucial for survival". (P14; 468; B; MME; Machine Tools; PSQ,Q53, 57, and 58).

"Price control, inflation, high company taxation, political uncertainty, e.g. three day weeks, general lack of freedom and confidence, have all contributed to an

investment finance shortage. Also, the government must offer more information regarding its plans for nationalisation, credit availability, etc. The banks insistance on double control over loans, i.e. high rates and low repayment periods, has also been responsible for below par investment activity". (P15; 14; B; MME; Industrial Signs; PSQ,Q53, 57, and 58).

"Government action has little bearing on our investment plans except that with our 'pay as we go' policy, reduced corporation tax would obviously make available more funds for capital items". (P16; 10; C; MME; Press Tools; PSQ,Q53, 57, and 58).

"If the government demonstrated real investment incentives then the firm would respond. For example, when we had no income in 1971, we could obtain no government aid, but our small earnings in 1972 were very quickly taxed away when we could have profitably invested them in our export markets". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q53, 57, and 58).

"Government intervention could adversely affect our investment planning, e.g. the proposed capital transfer tax seems designed to destroy small firms whether efficient or not". (P19; 60; B; MME; Boats; PSQ,Q53, 57, and 58).

"Government stop-go policies have hindered our production flows from time to time. A credit squeeze reduces demand for our standard boat whilst the luxury model remains unaffected. Some urgent production scheduling becomes necessary and not without some fall in profit. Ultimately, finance for investment is correspondingly reduced. The answer lies in the need for more consistency via government policy". (P20; 120; B; MME; Luxury Boats; PSQ,Q53, 57, and 58).

"Government contracts, e.g. naval dockyard, have tended to stimulate some investment and the finance has been obtained irrespective of problems. Direct intervention of this kind seems to be effective. But if this work is withdrawn or not renewed, then excess capacity would be costly, and the investment wasted. Thus, the firm has usually adopted a slow expansion policy in relation to work potential". (P21; 1; A; MME; Repair Cylinder Blocks; PSQ,Q53, 57, and 58).

"If the government were to implement measures which raised our profits directly, e.g. by lower taxation,

reduced rates, falling wage inflation, etc., then we would invest more. Indirect policies, e.g. regional aid, would have little or no effect". (P22; 21; B; MME; Boats; PSQ,Q53, 57, and 58).

"If our profits were raised by government action then the finance would be available for selected investments. Increased profit would make for much needed confidence". (P23; 50; B; MME; Iron Castings; PSQ,Q53, 57, and 58).

"Our investment decisions tend to be influenced only indirectly by government policies. We consider that we make our own financial decisions. However, if the government were to permit the retention of more profit, then investment would respond in the longer term. Also, a cheap money policy, say 5%, could similarly ease short run investment finance problems". (P24; 200; C; MME; Toolmaking; PSQ,Q53, 57, and 58).

"Generally, we would favour more freedom from governments to make and retain profit for investment purposes. Reduced corporation tax, possibly on a sliding scale for small firms, should be considered. Bank finance for investment is rather restrictive in that rates are too high, repayment periods are too short, and mortgage security requirements are over emphasised". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q53, 57, and 58).

"Occasionally, government policy affects our operations, e.g. V.A.T. of 25% on boats has reduced demand and utlimate profitability. Longer term investment planning is bound to be influenced by this". (P26; 70; A; MME; Trawler Repairs; PSQ,Q53, 57, and 58).

"Confidence in the future is needed before investment occurs. But if firms were allowed to keep their profits on the understanding that the untaxed surpluses would be directly invested in plant and machinery, then this would be an inducement for long term capital spending". (P27; 40; D; MME; Thermowells; PSQ,Q53, 57, and 58).

"Governments tend not to acknowledge the needs of small firms, whilst banks are only concerned with short run returns rather than long run potential". (P28; 4; B; MME; Aluminium Castings; PSQ,Q53, 57, and 58).

"Governments must leave small firms free to innovate, make profits, and serve the local community. Profitability is more likely to lead to investment longer term

rather than remote and inapplicable government policies". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q53, 57, and 58).

"Governments cannot create markets but they could help to stabilise them if they were interested in small firms, e.g. more government contracts in the regions. Also, more direct help is long overdue to raise profits and reserves which would be utlimately utilised for investment purposes. The government failed to reduce corporation tax in April 1975 when this would have merely allowed firms to keep more of what they actually earned". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ, Q53, 57, and 58).

"We are usually affected by any government policy which hinders the building trade, e.g. credit squeezes readily impact upon construction where borrowing is short and returns are long. Governments should consider again the possibilities of nationalising building with the prime intention of stabilising the industry. Investment would respond to the likelihood of stable markets and the resultant profitability". (P31; 50; B; MME; Steelwork; PSQ,Q53, 57, and 58).

"Government policies which merely promote employment are no inducements to small firms to invest. Direct action is required, e.g. allow firms to ratain more of their profits for capital spending purposes albeit over the longer term". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q53, 57, and 58).

"Governments tend not to be sympathetic towards small firms and banks refuse to appreciate long term and seasonal problems. Not aware of the Bolton Report or of government promises to implement the recommendations". (P33; 3; A; MME; Luxury Yachts; PSQ,Q53, 57, and 58).

"Profitability has obviously been affected by price control, inflation which causes price to be raised ahead of profit, and excessive company taxation. This in turn has reduced the incentive to invest since the funds which would normally have been used, are not available". (P35; 20; B; EE; Electric Motors; PSQ,Q53, 57, and 58).

"Governments seem to be anti-small firms, e.g. by applying the same tax rates as large companies, penalising the self-employed, and so on". (P36; 122; C; EE; Communication Equipment; PSQ,Q53, 57, and 58).

"If a government contract is secured then this would be a direct influence on future investment plans. But government policies generally, e.g. changes in the minimum lending rate, would be regarded as indirect. The government should engage more in the former than the latter, and the banks should assess potential rather than historical record". (P38; 8; B; EE; Control Panels; PSQ, Q53, 57, and 58).

"Government policy of penalising the efficient firm does not encourage investment. If more profit were left within the company rather than taxed away, then capital spending would ensue". (P40; 158; B; TLCF; Clothing; PSQ,Q53, 57, and 58).

"Company taxation is too high since it reduces our investment funds. Also, the lack of action regarding foreign imports has removed the incentive to invest for the time being. Together with the general problems posed by inflation, etc., profitability has been adversely affected. The banks tend not to appreciate this in that credit can be obtained on a good profit record only. But low profits may not necessarily mean inefficiency, or poor potential. However, the financial institutions are somewhat reluctant to help when financial assistance is needed, and especially if large amounts of capital are sought". (P41; 150; C; TLCF; Clothing; PSQ,Q53, 57, and 58).

"Government action could be crucial for this firm if government contracts were withdrawn or reduced. Other policies tend to be remote influences only, e.g. costs of borrowing. Confidence and stability are required if firms are to invest. Bailing out operations by governments tend to reduce rather than raise confidence and expectations". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q53, 57, and 58).

"Remote government policy does not influence investment decisions on a day to day basis. But direct assistance, e.g. reduced corporation tax to raise profit would be more effective. Also, £2,800 million aid for British Leyland tends not to inspire small firms' confidence unless, of course, those firms deal specifically with British Leyland". (P43; 13; C; TLCF; Wet Suits; PSQ, Q53, 57, and 58).

"Our current profitability is less than 10% on sales, yet glass is a vital industry. Overheads, i.e. rent and rates, are excessive and governments should be prepared to assist directly in the areas most relevant". (P44; 45; D; BPG; Glass; PSQ,Q53, 57, and 58).

"Investment is determined by internal decision and not by government policy. However, if the government were to arrest inflation, and stop attacking the small firm and the self-employed, then investment would most likely respond in the longer term". (P45; 23; C; BPG; Pottery; PSQ,Q53, 57, and 58).

"Governments, via the banks, could help the small firm in the regions and especially where seasonal trades are involved. For example, the banks should be prepared to accept that a seasonal difficulty could last for five years, and not necessarily six months". (P47; 13; B; BPG; Pottery; PSQ,Q53, 57, and 58).

"Inflation control, reduced company taxation, less bureaucratic form filling for aid, etc., would be investment influences up to a point only, since capital expenditure decisions are fundamentally determined at firm level". (P48; 25; C; OMG; Furniture; PSQ,Q53, 57, and 58).

"Inflation, which has eroded cash flow and rates of return, has discouraged current capital spending. However, lower corporation tax, and the removal of V.A.T. from blinds, would increase profitability directly, and over the longer term this reluctance to invest would be counter-balanced". (P49; 19; B; OMG; Blinds; PSQ,Q53, 57, and 58).

"We tend to be dependent on the engineering industry's demand for packaging. If industrial stability could be maintained by government then this would stimulate investment here. Increased profits would contribute to this stability". (P50; 44; C; OMG; Cardboard Containers; PSQ, Q53, 57, and 58).

"Our investment decisions are not normally affected by government policy. But if decisions apply directly to our profitability then this could be relevant. Where banks are unsympathetic, a cheap money policy similar to 1945-1950 could be successful for selected small firms wishing to expand with ready markets and a record of acceptable profitability". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q53, 57, and 58).

"Government policy affects our decisions vitally. Government contracts, government spending on education, government imposed taxation, etc., all influence capital expenditure planning". (P53; 20; C; OMG; Furniture; PSQ, Q53, 57, and 58).

"Apart from the influences of inflation, which can be self-correcting, taxation, credit squeezes, etc., our investment decisions are not affected on a day to day basis. However, if the application for grants procedure had been simpler, then certain delayed investments would have already occurred. The banks have been reasonable with us regarding investment finance, but they can afford to be at excessively high interest rates". (P54; 24; B; OMG; Printing; PSQ,Q53, 57, and 58).

"Government policy has not influenced investment specifically but confidence and consistency in industry generally would enhance capital expenditure planning. There also seems to be a lack of information problem regarding external credit, rates of interest, terms, etc. Government backed schemes operating through the local bank might overcome this problem". (P56; 50; B; OMG; Printing; PSQ,Q53, 57, and 58).

"Known factors such as high corporation tax, inflation, etc., have affected confidence regarding future investment to some extent, whilst the implications of capital transfer taxation, the National Enterprise Board, wealth taxation, and the Industry Bill (1975) have underlined this pessimism". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q53, 57, and 58).

"Possible investment here has been hit by certain government measures especially credit squeezes which disrupt the building industry immediately, and impact upon us almost as quickly. The government should recognise the importance of the building trade and stabilise the cycle by firm government contracts irrespective of economic conditions, e.g. in the housing market. Intervention tends to be in the wrong direction, e.g. proposed capital transfer taxes, and wealth taxation, etc., destroy confidence in firms' ability to make and retain profit, which in turn, must inhibit investment". (P59; 175; D; OMG; Concrete; PSQ,Q53, 57, and 58).

"The absence of government control over building hinders our investment decisions. The building programme should be stabilised and taxation should be reduced. These together with tax free expenditure over the first year would encourage current investment". (P60; 106; C; OMG; Building Materials; PSQ,Q53, 57, and 58).

"Governments cannot influence firms' investment which must in the end be determined by the market. In any event, established firms prefer freedom rather than

intervention. For example, government regional aid could act as a deterrent to established companies if new firms located in the area by government incentive poach skilled labour trained by local companies". (P62; 400; C; OMG; Business Systems; PSQ,Q53, 57, and 58).

"There has probably been too much government intervention in favour of large firms. What is needed is lower taxation, help for small firms in the regions, and the abandonment of policies likely to deter further investment, e.g. Industry Bill (1975), Capital Transfer Taxation, National Enterprise Board, etc. The banks too, could assist more by assessing small companies as a whole and not merely on their past financial performance". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q53, 57, and 58).

"Political uncertainty has an unsettling effect, and firms would respond to more freedom rather than less. Policies, or lack of policy, which reduce liquidity are bound to restrict firms' decisions to invest. Firms traditionally employing their own funds for investment, obviously look to governments to rectify this". (P65; 30; B; OMG; Tents; PSQ,Q53, 57, and 58).

Thus, we may observe that small firms' investment was, in the main, more likely to respond to government action which impacted <u>directly</u> on profitability rather than policy which promised <u>indirect</u>, delayed, or unidentified financial assistance. Additionally, whilst firms confirmed that increased profits would most likely result in investment ultimately, they also stressed the need for confidence and market stability, and this had to be inspired by government. Incidentally, practically all firms considered that their industries were vital and worthy of preferential treatment, especially if they exported. But if firms emphasised the importance of direct and immediate financial assistance, an issue of some concern here was whether monetary policy was as successful as governments presumed. Had bank credit manipulation, e.g. 1971 Competition and Credit Control (10) been an effective influence on investment? Did reductions in the minimum lending

rate promote capital expenditure activity in small firms? Was there any evidence that increases in the M.L.R. actually reduced investment? And if we are to regard regional aid as relatively direct, how reliable was this form of finance as an investment inducement? If answers to these questions suggested that investment finance opportunities were being rejected then, again, we would be bound to note that investment activity was somewhat below that which was reasonably attainable.

CREDIT AVAILABILITY

Liquidity in the economy has been varied since 1945 chiefly by the authorities, i.e. the Central Bank influencing the liquidity of the joint stock banks by the operation of monetary policy. This has involved:-

(i) The regulation of credit by the banks' being required to maintain the former 8% and 28% rules and the current 12½% reserve ratio.

(ii) Changes in the former bank rate and the current minimum lending rate.

(iii) Hire purchase control.

(iv) Open market operations, i.e. the buying and selling of securities on the open market by the authorities.

(v) The compulsory placing of special deposits at the Bank of England by the commercial banks.

(vi) Central directives to the banks in attempts to discriminate in the allocation of credit.

If these measures increased the supply of money in the economy then firms had the opportunity of becoming more liquid and thus in a better position to invest.

But in 1971 the authorities' "Competition and

Credit Control" document effected fundamental changes in credit availability. And these changes and the subsequent effects up to 1975 were highly relevant to the Plymouth Survey since this covered the period under review. The 1971 document was a new philosophy (in state intervention terms) in credit control. Had the Plymouth firms' investment strategies been influenced by this or not? Before we can examine this question it will be helpful to set out a summarised version of the events between September 1971 and the middle of 1975 when the survey interviews were completed.

Since the end of World War II, and particularly after 1965, the banking sector had tended to develop unevenly with the joint stock banks predominant, but with the merchant banks, finance houses, money shops, etc., gaining rapid prominence. Table 4.6 demonstrates this.

Table 4.6 Increases in Deposits 1965-1970

Sector	Increases in Deposits
Joint Stock Banks	21%
Others	156%

Source: Bank of England Quarterly Bulletins

The joint stock banks had always operated a cartel system with all borrowing and lending linked to the bank rate. The Monopolies Commission had been critical of the lack of competition with the banking sector as compared with peripheral banking. The 1971 rules aimed for a rationalisation of the situation and a more balanced response to market forces.

The principal points included:-

(i) The abandonment of the cartel system.

(ii) The severing of the links with the bank rate.

(iii) Permitting banks to fix their own base rates.

(iv) The abolition of the 8% and 28% rules in favour of a new 12½% reserve ratio.

(v) The removal of all physical directives on bank lending.

(vi) A new major control of the money supply by the banks providing special deposits at the Bank of England as required.

(vii) A new credit creation multiplier of 8 from the 12½% rule instead of a multiplier of 3.56 based on the old liquidity ratio of 28%.

(viii) The eventual conversion of the rigid bank rate into a new market flexible minimum lending rate (1972).

The effects of these measures were that:-

(i) Private loans increased dramatically from £1,856 million in 1971 to £6,452 million one year later.

(ii) The money supply (M3) grew rapidly by 28% between April 1972 and March 1973.

(iii) Monetary control by the market mechanism began to be questioned, and the banks were asked, against the spirit of the 1971 document, to restrain certain forms of credit.

(iv) Interest rates were forced upwards, the minimum lending rate reaching a record 13% in 1973.

(v) Suspicions about the smallness of the reserve ratio emerged as the banks found little difficulty in holding the 12½% ratio with 15% being the average.

(vi) The banks extended their services, e.g. insurance, mortgages, etc., and "overloading" fears were being expressed by observers.

(vii) The banks made excessive profits which led in time to political undertones.

The government was forced to re-think the position and by 1972 the suggestion was a return to some form of control.

The results of the 1971 doctrine were confused since the change seemed long overdue to provide a more flexible credit facility, but the system had not produced the desired results. But it should be noted that distortions in the economy included the oil crisis, industrial unrest from the 1971 Industrial Relations Act, political uncertainty from confrontation issues, adverse balance of payments problems, the downward floating of the pound sterling, and a worsening inflationary situation.

But the main problems during 1972 was that despite bank competition, industry was slow to borrow. They already had too much excess capacity, a point confirmed by the Plymouth Survey firms. However, the demand for houses increased, and prices rose with the Building Societies eager to lend. Not surprisingly, property developers were approaching the banks for funds which had originally been intended for firms' investments. Bank lending over-reached itself and the banks' need to borrow intensified. By July 1972 the interest rate on overdrafts had touched 11%. By August 1972 the Central Bank had to instruct the commercial banks not to lend to property developers in an attempt to discourage speculation. Thus, the brakes were gently applied to the 1971 credit expansion policy.

At the beginning of 1973 bank lending charges reached 13% and bank profits continued to rise. The joint stock banks were also under fire for not revealing their charges. In the meantime, property developers were now paying excessive prices for land, and much of the finance for these transactions was now being provided by the fringe banking sector. Foreigners became suspicious of the United Kingdom financial position and in July 1973 there was a run on the pound. The minimum lending rate rose to $11\frac{1}{2}\%$. Around this time, industry at last made tentative moves to borrow, and the result was that interest rates were

forced even higher. The banks then found that they had to borrow themselves to cover personal advances which had trebled in two years; loans to property companies which had quadrupled; and industrial demands. But the high rates brought about mortgage difficulties and Building Society depositors withdrew their funds for higher returns elsewhere. The building trade was unable to sell houses, land values fell, and property developers found themselves in trouble financially. Bank profits, however, were by now sufficiently high to enable the abolition of bank chrages. But new problems arose. The Middle East war in the Autumn of 1973 brought about the oil crisis. Inflation reached 10% with the minimum lending rate at 13%. The stock market began to fall significantly, and the London and County Securities Bank collapsed. Clearly, 1973 was a year of uncertainty in forming expectations regarding the government's plans for future credit availability.

Indeed, 1974 had the ingredients of crisis. A question was whether loans to the property developers could, in fact, be recovered. The Bank of England had to set up a "rescue operation" as more and more fringe banks experienced difficulties. Property values fell by a third, but bank profits were now at levels which provoked an election issue in February 1974. By this time the banks had already contributed some £1,200 million towards the Bank of England's "rescue operation", and industry began to intensify its demand for credit, but not, unfortunately, for investment, but to cover the problems of government price control, high company taxation, and inflation. In addition to this the banks could not afford to continue with the "rescue operation", and their bad debts were expected to be high. Thus, towards the end of 1974, the 1971 philosophy of market freedom was on the verge of collapse, and early 1975 saw the banking system virtually

back to square one with many of the old controls reintroduced.

Therefore, the period 1970 to 1975 was an interesting one in research terms for it contained wide degrees of credit control. In 1970 the original monetary policy rules were in force, including stop-go. By the end of 1971 the rules were "reversed" and credit availability via the market mechanism was in operation, and expansion continued throughout 1972. However, a tightening up of the system could be discerned during 1973. The beginnings of a return to the old controls emerged during 1974, and by early 1975 the full circle was complete. Thus, Plymouth Survey firms had experienced control and market freedom during the period under review. Had their investment planning been affected by the varying degrees of credit availability during this time? To what extent was monetary policy an effective stimulation of investment in small firms? Interviewees were asked to consider this in the light of their own experiences.

EFFECTS OF GOVERNMENT CREDIT CONTROL

From the responses collected in respect of the effects of government credit manipulation on small firms' investment activity, the following table could be compiled.

Table 4.7 Effects of Government Credit Control on Small Firms' Investment. Plymouth Survey

Most Dominant Degree of Influence	Employee Groups 0-24	25-99	100-199	200+	Totals
NO EFFECT if:-					
Taken long term	6 (23%)	4 (22%)	3 (25%)	3 (33%)	16 (25%)

Table 4.7 (Continued)

Most Dominant Degree of Influence	Employee Groups 0-24	25-99	100-199	200+	Totals
NO EFFECT if:-					
Borrowing kept to minimum	2 (8%)	4 (22%)	1 (8%)	1 (11%)	8 (12%)
Credit not required	5 (19%)	2 (11%)	1 (8%)		8 (12%)
Investment vital, e.g. repairs & maintenance	2 (8%)	1 (5%)	2 (17%)	2 (22%)	7 (11%)
SUB-TOTAL:-	15 (58%)	11 (61%)	7 (58%)	6 (67%)	39 (60%)
SOME EFFECT if:-					
Taken over short term	5 (19%)	2 (11%)	2 (17%)	1 (11%)	10 (15%)
Outlay is large	5 (19%)	3 (17%)	2 (17%)	1 (11%)	11 (17%)
Credit control severe and sustained	1 (4%)	2 (11%)	1 (8%)	1 (11%)	5 (8%)
SUB-TOTAL:-	11 (42%)	7 (38%)	5 (42%)	3 (33%)	26 (40%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 56

The results show that credit availability or control, i.e. easy or restricted funds, had had no, or little, effect on 60% of the sample, and where some influence was discernible in 40% of the population, this had occurred only under special conditions. A significant feature was that 25% of the firms felt that credit control would not be effective if viewed over the longer term. Investment which had to be postponed due to a shortage of funds, would simply be undertaken at a later date. Similarly, if finance were made freely available, this in itself would

be no determinant of investment as already indicated in Chapter 3. If firms had traditionally maintained a low level of borrowing or had not required funds on a large scale, and a number of the smaller firms were in this category, then government credit manipulation was likely to have negligible effect on those companies. And if investment was regarded as crucial, e.g. repairs and maintenance, then this spending would have to proceed and the funds acquired from alternative sources. Thus, the impression was that investment in these firms was unlikely to be influenced by monetary policy designed to regulate the amount of credit availability.

On the other hand, 40% of the sample set out conditions under which their investments might be affected. If credit were not available, then this could inhibit capital spending but only short term. In other words, this response simply reinforced the view that credit control was non-effective long term. However, if the control were severe and sustained, which was unlikely, then 8% of the sample believed that this would certainly influence investment.

Thus, the picture indicated that if governments wished to stimulate investment in industry, then the implementation of monetary policy should be awarded low priority. A selection of individual views in support of this are as follows.

"Credit squeezes tend to be self-defeating in that once the restriction is lifted, the spending takes place. And the opposite equally applies. Thus, credit availability control has no effect on investment over the longer term". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 56).

"We have traditionally used our own funds for our investments with the occasional bank facility. Credit

control or release merely causes adjustments in investment planning". (P2; 95; D; FDT; Brewing; PSQ,Q56).

"Credit availability might affect investment if the outlay is large and our own funds were not too hand". (P3; 50; C; FDT; Confectionery; PSQ,Q56).

"We have not required large amounts of credit for investment purposes in the past and therefore credit availability or control policies have been largely irrelevant. But occasional credit squeezes have caused overdraft difficulties and problems of liquidity". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q56).

"Normally we would proceed with an investment decision if it were known or suspected that any credit restraint would not be severe or sustained". (P6; 450; D; FDT; Meat; PSQ,Q56).

"Credit control has had no effect on our investment decisions since all transactions have been paid for in cash". (P7; 20; C; FDT; Minerals; PSQ,Q56).

"Investment is not necessarily influenced by credit availability. For example, the parent company could provide funds but has chosen not to do so for the new overdue Plymouth plant". (P8; 300; C; FDT; Bread; PSQ,Q56).

"Investment depends basically on need. If funds are not available then the investment would simply be postponed until credit restrictions eased". (P9; 15; D; CAI; Fertiliser; PSQ,Q56).

"Large amounts of credit for investment have not been needed since setting up in 1968. But if credit were required and it was not available, then the investment would probably be held over until conditions were more favourable. On the other hand, if credit were unrestricted, this would not necessarily stimulate capital spending beyond that budgeted". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q56).

"Investment tends to be long term, and/or vital, and credit availability merely indicates when spending takes place rather than whether it should occur or not". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q56).

"Investment has been modest to date apart from the early years. Credit squeezes can hinder capital spending but investment would not automatically occur in response

to credit made freely available". (P12; 8; C; MME; Injection Moulds; PSQ,Q56).

"Investment is not so much a question of credit availability but at what cost of borrowing is involved. Finance can usually be acquired irrespective of monetary control". (P13; 170; B; MME; Steelwork; PSQ,Q56).

"Credit control could be serious if the investment decision had been taken, but the banks usually have been able to supply funds as our requirements have been limited". (P15; 14; B; MME; Industrial Signs; PSQ,Q56).

"Government credit manipulation has had no effect on our investment decisions as we are against borrowing on a large scale and we have traditionally always paid our own way". (P16; 10; C; MME; Press Tools; PSQ,Q56).

"Our consolidation policy has restricted our demands for credit. Investment is determined by need rather than credit availability". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q56).

"Credit availability merely makes the investment decision easier but it would never influence the decision significantly. Profit and confidence in future returns are needed for this". (P19; 60; B; MME; Boats; PSQ,Q56).

"The supply of credit for investment has been no problem to date as we have tended to restrict our spending to that determined by our own funds". (P20; 120; B; MME; Luxury Boats; PSQ,Q56).

"Credit squeezes have brought about economy drives which in turn have led to occasional postponements of representative placings. But if the investments were considered to be vital then these would simply go ahead". (P21; 1; A; MME; Repair of Cylinder Blocks; PSQ,Q56).

"Investment tends to proceed on the basis of necessity rather than credit control or availability". (P23; 50; B; MME; Iron Castings; PSQ,Q56).

"If an investment decision has been made then government credit policy would be of secondary importance". (P24; 200; C; MME; Toolmaking; PSQ,Q56).

"We have had no credit problems to date provided that the outlay has been relatively small. Investment has normally proceeded on the basis of customer demand

and credit control cannot directly determine this". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q56).

"Investment would go ahead long term irrespective of the degree of credit availability". (P26; 70; A; MME; Trawler Repairs; PSQ,Q56).

"Credit had to be found initially when the company was established in 1972, but no large amounts have been required since that date". (P28; 4; B; MME; Aluminium Castings; PSQ,Q56).

"A squeeze could postpone capital spending but normally investment would be influenced by our own funds being available". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q56).

"The degree of influence of credit control on investment would depend more on the nature of the latter than the former". (P31; 50; B; MME; Steelwork; PSQ,Q56).

"Credit rating depends on the profit record of the firm which can be affected by government policy, e.g. high company taxation. But normally, investment is determined by necessity". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q56).

"There has been no need for large investment funds and therefore capital spending has not been influenced by government credit restrictions or expansions". (P33; 3; A; MME; Luxury Yachts; PSQ,Q56).

"Investment has not been affected specifically by credit availability. In any event, we prefer to avoid excessive credit". (P36; 122; C; EE; Communication Equipment; PSQ,Q56).

"Credit availability at the right time would help an investment decision, but would not determine it". (P37; 27; C; EE; Location Systems; PSQ,Q56).

"If investment is considered necessary, e.g. Plymouth plant change over, then funds have to be found. Investment is not determined by credit availability". (P39; 800; D; TLCF; Footwear; PSQ,Q56).

"Funds would have to be raised if an investment was needed. Credit control merely determines the time the investment is likely to take place". (P40; 158; B; TLCF; Clothing; PSQ,Q56).

"There have been no major investment funds problems here. Bank credit is usually available on a good profit record". (P41; 150; C; TLCF; Clothing; PSQ,Q56).

"Credit control tends to be an investment influence only". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q56).

"Freely available credit could be a false solution for us in that there is no guarantee that easy investment would solve our market problems". (P43; 13; C; TLCF; Wet Suits; PSQ,Q56).

"Our rising bank overdraft has resulted from 90% of our purchases being covered in 30 days, against our customers paying in 60 days despite a $2\frac{1}{2}\%$ discount; a situation difficult to rectify. Therefore, extra credit, e.g. for investment, has been kept to a minimum irrespective of credit conditions". (P44; 45; D; BPG; Glass; PSQ,Q56).

"Credit availability is important but subsidiary to the nature and importance of the investment in question". (P46; 140; C; BPG; Pottery; PSQ,Q56).

"Credit conditions could be important if the investment were on a large scale, but capital spending here has not been in this category". (P47; 13; B; Pottery; PSQ,Q56).

"Credit is avoided as much as possible and therefore credit control could only be of marginal influence". (P48; 25; C; OMG; Furniture; PSQ,Q56).

"If investment is decided and credit is available then the project would proceed. If credit is restricted then a postponement might be inevitable until conditions became more favourable. But favourable conditions do not in themselves influence investment". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q56).

"Fundamentally we need to expand and reorganise on a new level. But credit worthiness depends on past and future profits rather than government action. What is required is a specific cheap money policy in such cases as ours". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q56).

"The inclination to invest would depend on the severity or ease of the credit control in operation. Usually investment decisions take place if vital albeit over the longer term". (P52; 22; D; OMG; Coffins; PSQ,Q56).

"Credit availability could be important on certain occasions, but not over the long run". (P54; 24; B; OMG; Printing; PSQ,Q56).

"We have always used our own funds for investment purposes and our new premises were paid for by our providing one third of the cost and the bank covering the rest. The decision to move was delayed as a result of this rather high bank commitment in our opinion. Easy credit was never regarded as an easy solution to problems". (P55; 25; A; OMG; Vehicles; PSQ,Q56).

"We are against the use of credit on a large scale irrespective of terms and conditions". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q56).

"If credit is tight for investment purposes then capital projects have to be more rigorously thought out. Thus, credit restrictions can be more beneficial than credit freedom". (P60; 106; C; OMG; Building Materials; PSQ,Q56).

"In 1971 when the firm was formed credit was needed for capital items. In this case investment was strongly influenced by credit availability. But subsequently investment tends to be independent of credit conditions over the longer term". (P61; 124; C; OMG; Joinery Tools; PSQ, Q56).

"Credit freedom can be a confidence factor without actually overshadowing the real determinants of investment - necessity and rival activity". (P65; 30; B; OMG; Tents; PSQ,Q56).

It is tempting to deduce from all this that firms were not exactly optimising their investment activities in relation to credit manipulation by the authorities.

On the one hand we observe that firms would invest if they considered it necessary to do so irrespective of credit conditions. In this sense the firm could be seen to be pursuing investment opportunities against the constraints and thus hopefully optimising. But on the other hand it seemed clear that the release of credit by the 1971 policy had done little to actually increase real investment. Firms had simply invested as required, and had

not taken advantage of easy credit facilities. Indeed, several firms confirmed that they avoided excessive credit as a policy presumably in the belief that credit led to losses, however defined.

Are there any lessons for government here? The results suggest that the promotion of investment in small firms appears to require rather more than the mere manipulation of credit availability. And Table 4.8 and Figure 4.1 add weight to this argument.

Table 4.8 Money Supply (M3) and Real Investment by All Manufacturing Industry 1970-1975

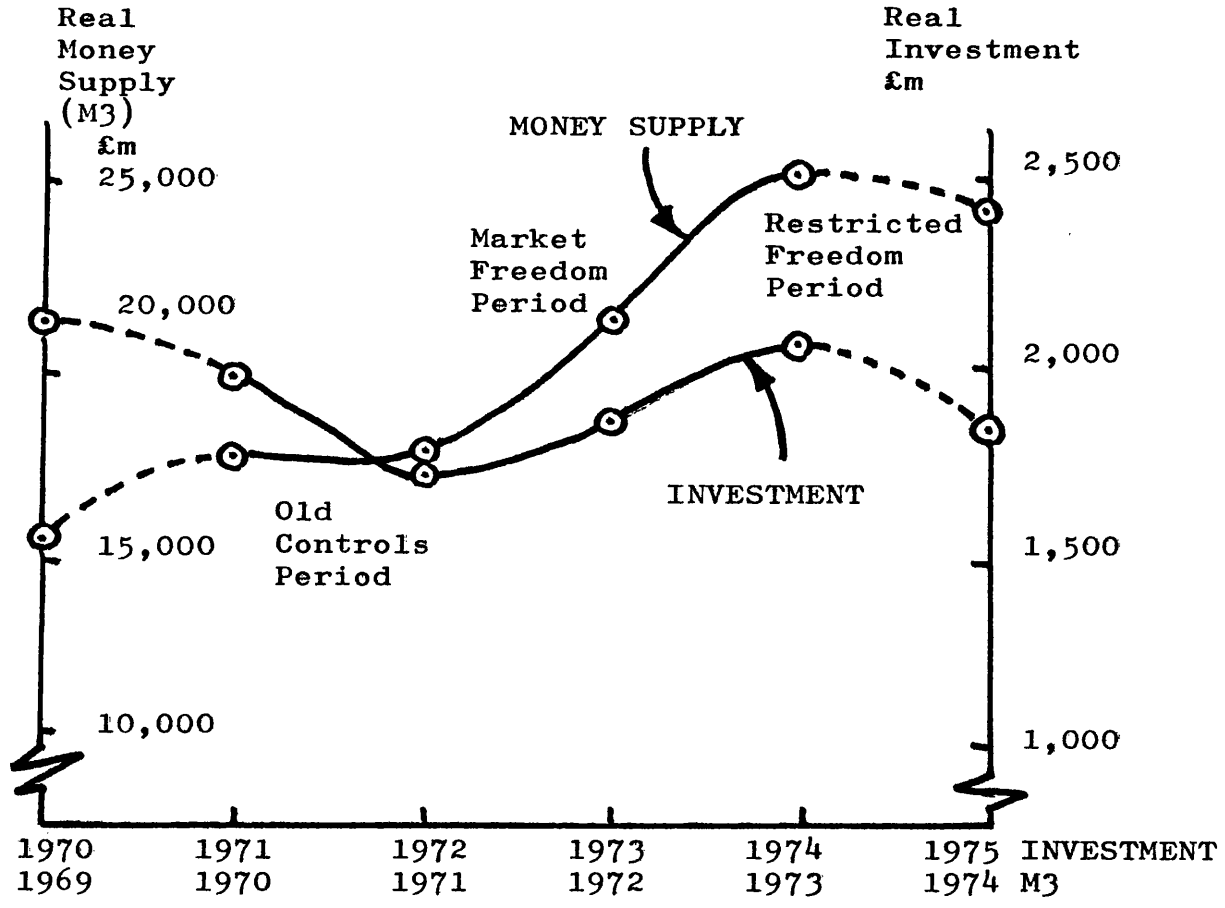
Year	Money Supply (M3) £m	Investment by Manf'g Industry in REAL terms £m	Price Index (1970 Base)	REAL (M3) £m
1969	16270		94.7	15407
1970	17850	2130	100.0	17850
1971	20240	1991	113.2	17879
1972	25920	1738	121.2	21386
1973	33150	1864	132.4	25037
1974	37300	2087	153.7	24268
1975	38587	1820	190.9	20213
1976		1640 (est)		
1977		1850 (est)		

Sources: Bank of England Quarterly Bulletins, 1970-75
Economic Progress Reports, H.M.S.O., 1970-75
Dept. of Industry Survey, 1977.

Whilst it is certainly not intended to suggest that the money supply represents the amount of credit available for possible investment, the expansion of M3, i.e. the wider definition of the money supply including bank deposits, over the period could be taken as an indication

of the growth of funds hopefully intended for capital expenditure. But when real M3 is compared with real investment by manufacturing industry on a one year time-lag basis, no reliable relationship is apparent since the rapid growth of the former between 1971 and 1974, i.e. 35%, simply produced a rather modest investment peak in 1974 before falling away again in 1975.

Fig. 4.1 Relationship Between the Real Money Supply (M3) and Real Investment by Manufacturing Industry on a 1 Year Time-Lag Basis During the Period 1970-1975



Sources: Bank of England Quarterly Bulletins 1970-75
Economic Progress Reports, H.M.S.O., 1970-75

In any event, the investment figures refer to the whole of manufacturing industry and not specifically to the small firm sector, but the relationship between real M3 and real investment by the Plymouth Survey firms is dealt with in Chapter 9. Fig. 4.1 suggests that over the period in question, monetary policy appears to have been somewhat ineffective in the face of other pressures, e.g. firms' general lack of confidence. Investment seems not to be unduly influenced by government credit availability, and the Plymouth Survey extracts confirmed this. Table 4.9 derived from Table 4.8 also adds weight to this argument.

Table 4.9 Percentage Change Relationships Between Real M3 and Real Investment for ALL Manufacturing Industry 1970-1975

Period	% Change in real M3	% Change in real investment	Relationship
1969-1971 1970-1972	+16.0%	-18.4%	Negative
1970-1972 1971-1973	+19.8%	- 6.3%	Negative
1971-1973 1972-1974	+40.0%	+20.0%	Positive
1972-1974 1973-1975	+13.4%	- 2.3%	Negative
1969-1974 1970-1975	+57.5%	-14.5%	Negative

Sources: Bank of England Quarterly Bulletins, 1970-75
Economic Progress Reports, H.M.S.O., 1970-75

However, controls over the availability of credit may be effective in the short run and have the advantage that they can be discriminatory. Thus, they are useful as

emergency measures designed to supplement and strengthen other weapons. Additionally, the school of thought particularly associated with Milton Friedman of the University of Chicago believes that monetary effectiveness is underrated in that changes in the money supply will generate changes in economic activity, e.g. after a suitable time lag.

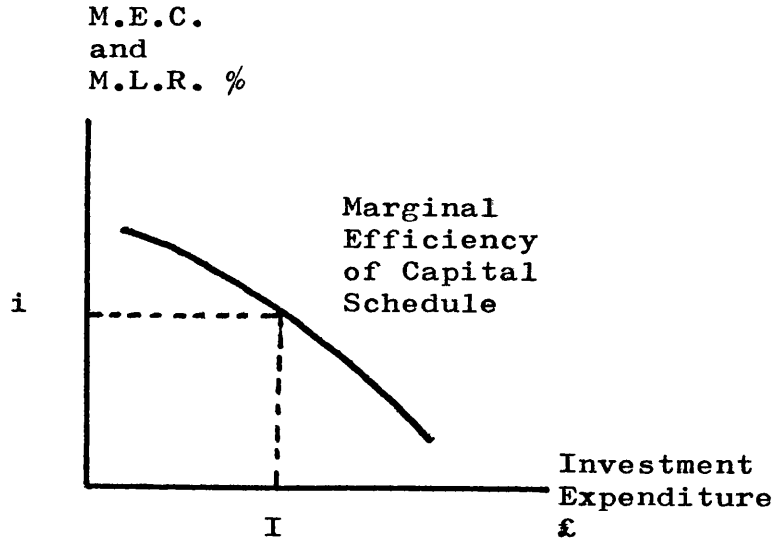
Clearly, there is much to argue from the Friedman and Keynesian (11) viewpoints, but the Plymouth Survey results, and the supporting data, do raise doubts about possible correlation between credit availability or control and investment by manufacturing industry.

MARGINAL EFFICIENCY OF CAPITAL

To establish the level of investment which will actually occur we must examine the decisions of individual firms. A business unit will normally expand its investment so long as the marginal efficiency of capital, (M.E.C) which is the expected rate of return from an additional unit of capital expenditure, is greater than the cost of purchasing the additional unit. The cost is represented by the market rate of interest as indicated by the minimum lending rate (M.L.R). Even if the purchase is to be made out of internal finance, there is still an opportunity cost, e.g. what could be obtained on a government bond or the share of another company. The level of investment in Keynesian terms will be determined by the intersection of the M.E.C. curve and the rate of interest as shown in Fig. 4.2. With a rate of interst "i" investment will be "I". A higher rate of interest will contract investment, a lower rate should expand it. Investment within the whole economy operates similarly. Thus, it is possible, in theory,

to draw up a schedule showing the amount of investment which will take place at different rates of interest. This is the investment demand schedule from which we can plot the demand curve for investment.

Fig. 4.2 The Investment Demand Curve with Respect to the Rate of Interest



Source: "The General Theory of Employment, Interest, and Money, J. M. Keynes, Harcourt, Brace & World, Inc., New York, 1936.

But how relevant is this theory in the real world? Would a persistently low rate of interest actually stimulate investment in small firms? Table 4.10 is of some importance in this respect.

INVESTMENT AND THE MINIMUM LENDING RATE

Table 4.10 Most Likely Result on the Level of Investment from a Change in the Minimum Lending Rate. Plymouth Survey

Investment Level:-	Employee Groups 0-24	25-99	100-199	200+	Totals
CONSTANT if MLR changes are negligible at high (20%) medium ($12\frac{1}{2}$%) or low (5%) rates		2 (11%)	1 (8%)	1 (11%)	4 (6%)
CONSTANT if MLR fall is significant at high rates	2 (8%)	1 (5%)	2 (17%)	1 (11%)	6 (9%)
FALLS if MLR increase is significant at low and medium rates	9 (35%)	6 (33%)	4 (33%)	3 (33%)	22 (34%)
RISES if MLR fall is significant at medium rates	2 (8%)		1 (8%)		3 (5%)
CONSTANT at high, medium, or low rates if project is vital, or returns exceed borrowing cost	5 (19%)	4 (22%)	1 (8%)	2 (22%)	12 (18%)
FALLS if outlay is large, long term, and MLR is high and rising	2 (8%)	3 (17%)	1 (8%)	1 (11%)	7 (11%)

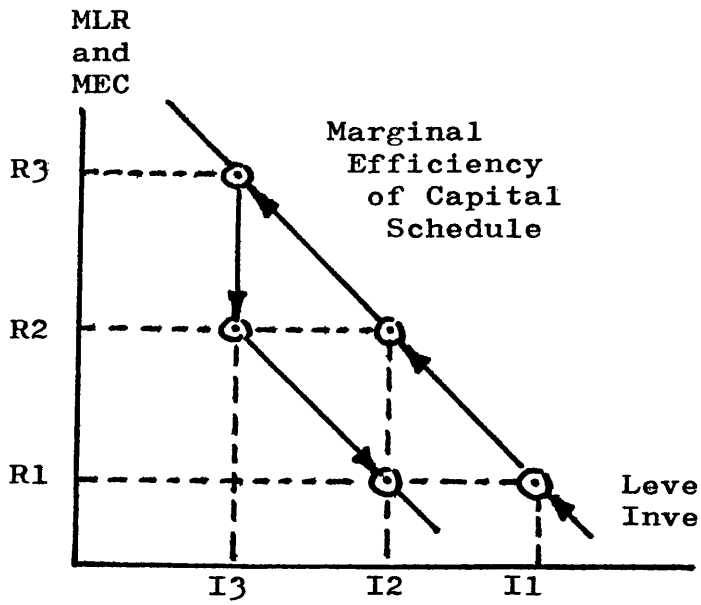
Table 4.10 (Continued)

Investment Level:-	Employee Group 0-24	25-99	100-199	200+	Totals
INDETER-MINATE depending on nature of project, expectations, uncertainty, etc.	6 (23%)	2 (11%)	2 (17%)	1 (11%)	11 (17%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 55

These slightly involved responses indicated that a rising rate of interest was more likely to influence the level of investment than a falling one. More specifically, a rising M.L.R. would reduce capital expenditure more than a falling rate would increase this spending. Figure 4.3 below summarises the position.

Fig. 4.3 Relationship Between the M.L.R and the Level of Investment. Plymouth Survey



Source: Plymouth Survey Questionnaires; Question 55

At rate R1 investment is I1. An increase in the MLR to R2 reduces capital expenditure to I2 whilst a further rise to R3 produces I3. If, however, R3 falls to R2 the MEC schedule is of zero elasticity and investment remains at the lower level I3. But a fall in the MLR from R2 to R1 does raise capital spending to the I2 level. Unfortunately, this point I2 is below I1 at the original rate of interest R1. It would appear that a time lag problem arises before I2 returns to I1, if at all. Clearly, from the table and graphs, monetary policy which reduces an already high MLR will not be effective until the rate is significantly reduced over the long term, whilst a rising rate would always impact more dramatically.

It might now be helpful to examine selected paraphrased extracts in order to add a little more detail to this general picture.

"The minimum lending rate has very little effect on investment planning in the short run, but would be more significant over the longer term. On the other hand, if the expected yield exceeded the MLR then the project would probably proceed regardless. Vital investment would also go ahead". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 55).

"The cost of borrowing could be important if the investment is large. If relatively small the MLR would have marginal influence only". (P2; 95; D; FDT; Brewing; PSQ,Q55).

"No credit is taken for investment and we have no overdraft on a large scale. The decision to invest does not depend on the MLR". (P3; 50; C; FDT; Confectionery; PSQ,Q55).

"During the 1960's the bank rate tended not to be an influence on capital spending if the need to invest were imperative. Also, a rising rate was regarded as short run only. Currently, high rising rates have had an inhibiting effect on investment, and the MLR would have to fall considerably before capital expenditure responded here". (P4; 600; D; FDT; Baby Food; PSQ,Q55).

"On necessary investment the MLR would have little or no effect on investment. But if the rate were permanently high and rising then there would emerge a cut off point". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q55).

"Vital investment would always proceed assuming that the MLR remained within tolerable limits". (P8; 300; C; FDT; Bread; PSQ,Q55).

"A high MLR would be an adverse influence on investment without being an actual determinant". (P9; 15; D; CAI; Fertiliser; PSQ,Q55).

"The cost of borrowing has become an important consideration even for necessary investment. But if the MLR were attractively low (5%) then capital spending here would revive". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q55).

"If the MLR is high (15%) and permanent then marginal investment would fall, whilst vital spending would probably proceed. Costs of borrowing would have to reduce dramatically to stimulate current investment". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q55).

"The MLR would have less effect on investment over the short run rather than the long run, and vice versa, depending upon the nature of the project. The result would be indeterminate". (P12; 8; C; MME; Injection Moulds; PSQ,Q55).

"Current rates are too high for us. The E.E.C. concession rate of 2½% would clearly stimulate investment here. The 10% to 20% range tends to have little permanent effect on capital spending". (P13; 170; B; MME; Steelwork; PSQ, Q55).

"High costs of borrowing would have to fall considerably to bring about noticeable changes in investment planning". (P14; 468; B; MME; Machine Tools; PSQ,Q55).

"Nominal changes in the MLR would probably have no effect on investment. But if, for example, the MLR rose to 15% then capital spending would be reduced if yields fell short of this". (P15; 14; B; MME; Industrial Signs; PSQ,Q55).

"Costs of borrowing have nil effect on investment since all our spending is on a cash basis". (P16; 10; C; MME; Press Tools; PSQ,Q55).

"The rate of interest is more important currently than on previous occasions. A high sustained MLR affects decisions when balanced with the expected rate of return. But low MLR's have had little effect in the past especially if the project was of some importance and the outlay small". (P17; 90; C; MME; Packaging Machinery; PSQ, Q55).

"If the cost of borrowing were reduced to say 10%, then this would not raise investment. It would merely ease our overdraft problems. If a rate of 5% were introduced then this would be the incentive needed". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q55).

"If the MLR is low then this would have a zero effect on capital expenditure. If the MLR were high then investment might be delayed". (P19; 60; B; MME; Boats; PSQ,Q55).

"The cost of borrowing is relevant to the investment decision if high and rising, but has less effect if falling". (P20; 120; B; MME; Luxury Boats; PSQ,Q55).

"Investment generally depends on the need in the short run and growth policy in the long run. A high sustained MLR, however, could affect this strategy". (P22; 21; B; MME; Boats; PSQ,Q55).

"All costs are relevant including the cost of borrowing. But marginal falls in high MLR's are not influential here". (P23; 50; B; MME; Iron Castings; PSQ,Q55).

"A heavily subsidised MLR is needed to encourage investment in small firms". (P24; 200; C; MME; Toolmaking; PSQ,Q55).

"The MLR normally has very little effect on investment directly, except that if that rate were excessively high and sustained". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q55).

"Downward movements in the currently high MLR have had no effect on our investment plans". (P26; 70; A; MME; Trawler Repairs; PSQ,Q55).

"Low rates are likely to be of less consequence than current high rates although the decision does depend on the nature of the investment in question". (P27; 40; D; MME; Thermowells; PSQ,Q55).

"From experience, the MLR is a more effective influence on investment if rising rather than falling". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q55).

"The cost of borrowing has never influenced our capital spending since no large investment items have been required, and crucial projects would proceed regardless". (P33; 3; A; MME; Luxury Yachts; PSQ,Q55).

"The MLR would have little effect on investments which were half-completed or considered vital". (P34; 20; B; EE; Cold Rooms; PSQ,Q55).

"Depending on the nature of the investment, a high MLR would be a deterrent especially if rising". (P35; 20; B; EE; Electric Motors; PSQ,Q55).

"Investment would only be influenced by the MLR if rising exceptionally. Marginal changes would have nil effect". (P38; 8; B; EE; Control Panels; PSQ,Q55).

"Nominal changes in the MLR have no effect on investment but notably rising rates have more impact than similarly falling rates". (P39; 800; D; TLCF; Footwear; PSQ,Q55).

"The MLR has no influence at all on investment. High borrowing costs which have to be paid are merely passed on to the customer. Only if the MLR were very low would investment be directly influenced". (P40; 158; B; TLCF; Clothing; PSQ,Q55).

"Changes in the MLR at high levels have markedly less effect on investment stimulation than changes at lower levels would reduce investment". (P41; 150; C; TLCF; Clothing; PSQ,Q55).

"Current costs of borrowing are too high. If the MLR stood at 5% then we might have considered purchasing our premises at the time, rather than renting. Negligible changes in the market rate have no effect on investment decisions". (P44; 45; D; BPG; Glass; PSQ,Q55).

"A low MLR would help but basically investment needs markets, confidence, and adequate rates of return". (P46; 140; C; BPG; Pottery; PSQ,Q55).

"Investment is based on internal planning, but if the MLR were high and rising, this would affect the decision. Vital work would have to proceed, however". (P48; 25; C; OMG; Furniture; PSQ,Q55).

"A MLR which has reached a peak and is sustained, will inevitably reduce investment. Even if this rate eventually fell, capital spending here would take time to adjust. A cheap money policy is needed to stimulate investment in small firms". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q55).

"When finance for the new plant was sought the rate was 9½%. This was considered high at the time, but not in retrospect. Thus, a high MLR could affect the whole decision to proceed". (P55; 25; A; OMG; Vehicles; PSQ,Q55).

"If the MLR is high and rising this could reduce investment even if the rate of return is greater. If the MLR is high and falling this might increase investment in the long run, but not significantly. Investment depends on the firm's own specific decisions, and the MLR is merely one item of influence". (P59; 175; D; OMG; Concrete; PSQ,Q55).

"No investment takes place unless known to be profitable. The MLR has no effect unless very high". (P60; 106; C; OMG; Building; PSQ,Q55).

"The higher the MLR the more influence on investment". (P62; 400; C; OMG; Business Systems; PSQ,Q55).

"High rising rates are more significant to us than falling rates". (P63; 170; D; OMG; Colour Film Processing; PSQ,Q55).

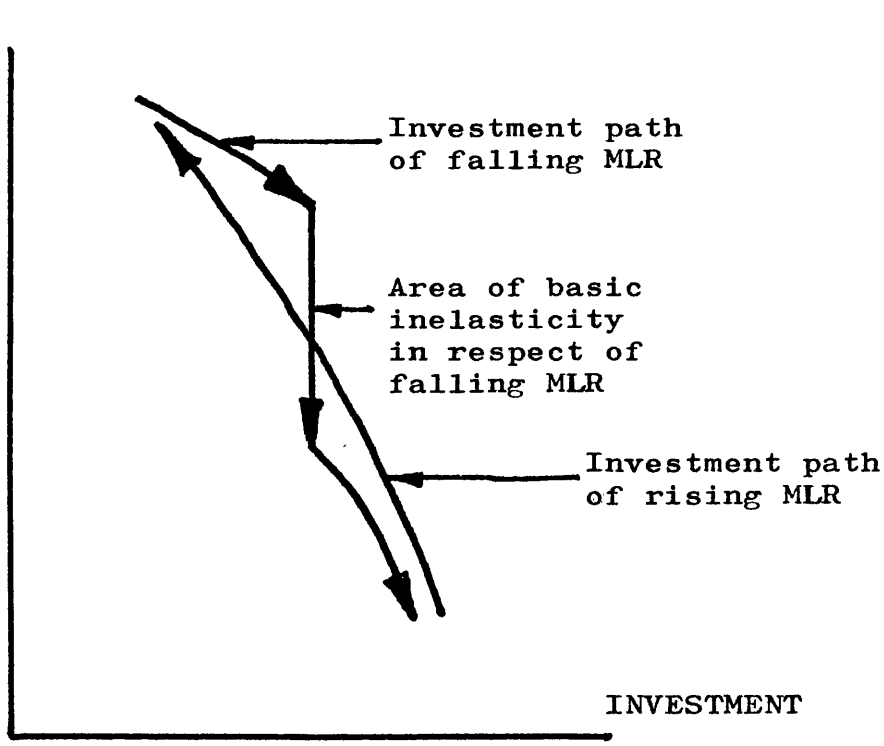
"Current research and development plus repairs and maintenance go ahead irrespective of the MLR. However, a high cost of borrowing would be a factor if the outlay were large". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q55).

Thus, in summary, it would appear that the MLR had a marginal influence only on investment at low rates, and a greater influence at higher rates, but not if the project were vital, provided that the outlay was not excessive, or long term. Additionally, it should be noted that some 33% of the sample felt that the MLR had little or no impact on investment at all; refer Table 4.10, (6% + 9% + 18%). A further 17% considered that the relationship

between the MLR and investment was "indeterminate". From this, the well known inelasticity of the marginal efficiency of capital schedule is basically confirmed.

Indeed, in general terms it is doubtful whether the rate of interest is an important determinant of the level of investment at any time. However, from the Plymouth Survey, it is possible to indicate certain instances

Fig. 4.4 The Marginal Efficiency of Capital Schedule. Plymouth Survey Version



Source: Plymouth Survey Questionnaires; Question 55

when investment may be responsive, i.e. interest elastic, to changes in the rate of interest. For example, a capital project may have yields which stretch far into the future. A firm may already be working to tight margins,

and there is not the scope for increasing prices through market imperfections. A shortage of internal funds may necessitate greater reliance on external borrowing. And interest charges on stocks may represent a higher percentage of total cost in certain small firms.

Even allowing for these instances, it is probable that the greatest impact of a change in the rate of interest on investment is through its psychological impact on expectations - as an indication of government intention and through the uncertainties of how it will affect a firm's customers. Because the rate of interest cannot be relied upon as a direct determinant of investment, its use as a monetary weapon must be for other reasons, chiefly external to attract funds from abroad and to restore international confidence, and internal through its psychological effect on industry generally.

Certainly, the investment behaviour of the Plymouth firms with regard to the MLR appeared to be somewhat involved and unpredictable. For example, a rising MLR reduced investment, but a falling one did not necessarily increase it (Fig. 4.4). If the MLR were reduced to a previous level where investment had occurred, and now firms were reluctant to proceed then it could mean that the companies were <u>unable</u> to invest for a variety of reasons, e.g. lack of funds. On the other hand it might be the case that firms were <u>reluctant</u> to proceed on the grounds that the expected yields were considered to be lower than the cost of borrowing as indicated by the MLR. The impression was that if the MLR were linked specifically with the level of investment then the latter was probably the case. But how were these yields actually assessed? If, for example, the calculations were non-rigorous, and it was suspected that they could be, e.g. some firms using a cash only policy failed to appreciate the concept of opportunity

cost, then obviously firms were in danger of losing occasional cheap finance, and ultimate profit.

Of course, one might argue that if calculations are crude it would be equally possible to make the right decision as the wrong one. But this would require rational behaviour from the firms in question, which appears not to be the case. For example, as we have seen, small firms tend to be somewhat over-cautious as far as investment is concerned. If the investment appraisal yield emerged as "high" then the safety margin in operation could still prevent the project's going ahead. And if the yield were lower than the MLR or cost of borrowing, then the investment would be automatically held over. But this whole question of investment appraisal is taken up in Chapter 5.

However, at this stage we may strongly infer that monetary policy involving nominal changes in the MLR, e.g. downwards, to influence investment, has not enjoyed, and is unlikely to enjoy, notable measures of success.

REGIONAL AID

Regional aid may be defined as any measures designed to influence the geographical distribution of economic activity, e.g. investment, and can be analysed in terms of both its social and economic aspects.

In looking at the social case for government intervention two distinct social aspects can be distinguished. First, in the absence of government intervention, the geographical pattern of economic activity would be uneven. Indeed, even with intervention the rate of unemployment has tended to be very much higher in the fringe areas of the United Kingdom - Scotland, Northern England, Northern

Ireland, and Wales - than in the central belt running from the Midlands down to London and South East England. This uneven pattern of unemployment and investment has persisted whatever the overall level of prosperity in the country, so that the problem has assumed particularly serious dimensions when economic acitivity has been minimal, e.g. 1930's.

The second social aspect is closely connected with the first. One of the consequences of uneven development is that considerable migration of labour occurs from the less to the more prosperous areas. In some respects, this problem is "desirable", as leading to a less uneven pattern of unemployment, and indeed, it has been encouraged by the provision of government assistance to workers to help cover the cost of removal, and by the setting up of training centres to enable such workers to acquire new skills.

However, migration has some less desirable consequences both social and economic. The "exporting" areas drained of manpower and resources, suffer decline. The "importing" areas experience excess spending, rising house prices, overcrowding, and drains on the social services. As a result, more government aid is necessary to ease an artificially created situation.

Consequently, the arguments for and against state intervention persists. Government policy has created jobs leading to a balancing out of spending and investing. The government itself has provided employment, e.g. naval dockyards, but the majority of jobs have occurred in the private sector.

The economic case against intervention includes the argument that individual firms are the best judges of sites and these may not always exist in the high unemployment areas. There could also be unnecessarily excessive transport costs, and the labour could be unsuitable. But on

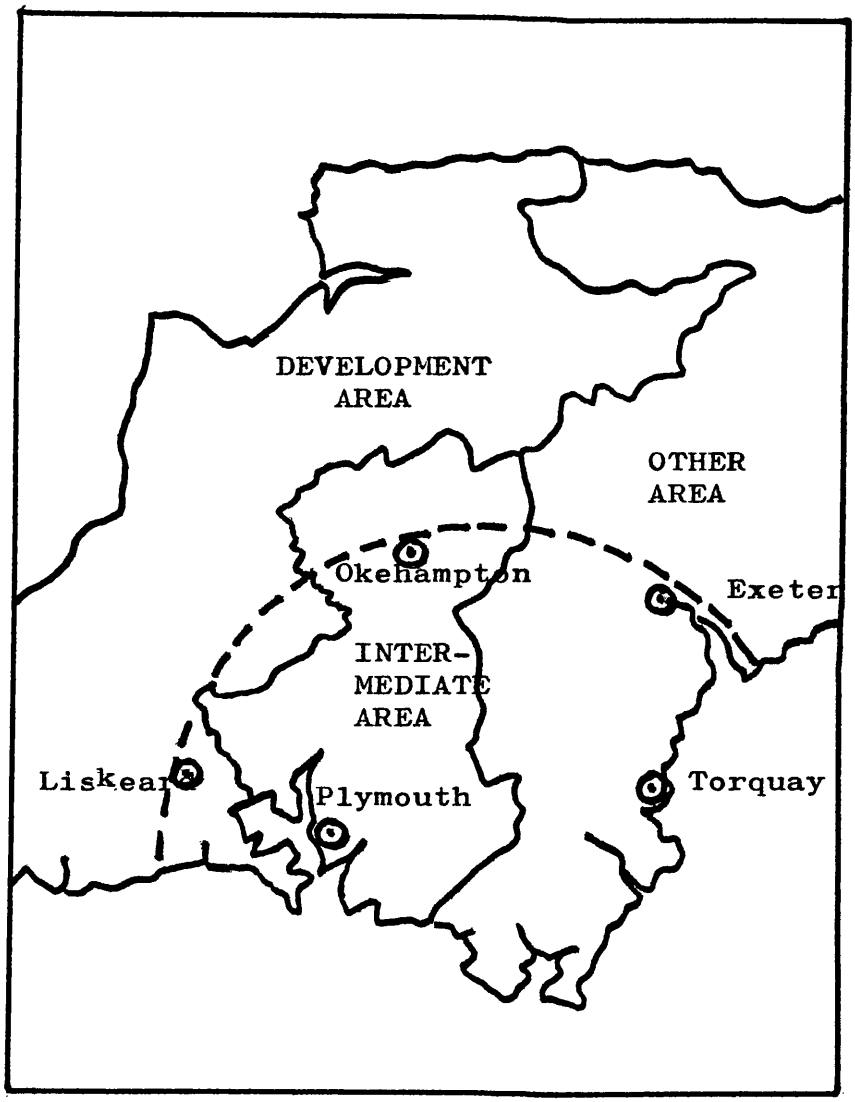
balance it is probably fair to claim that the case for intervention since 1945 tends to be the stronger. And in any event, Luttrell's study (12) showed that firms recovered financially fairly rapidly after "enforced" moves to the assisted areas.

Government policy during the period under review (1970-1975) in respect of the Plymouth Survey was designed to encourage still more employment and investment. The basis of much of this policy was first set out in a White Paper issued in March 1972. For the purposes of government assistance and control Great Britain was divided into five types of area. These were, in order of the level of assistance for which they qualified: (i) Special Development Areas; (ii) Development Areas; (iii) Intermediate Areas; (iv) Derelict Land Clearance Areas; and (v) Other Areas. The most extensive of the assisted areas were the development areas whose boundaries were defined by the 1966 Industrial Development Act. They then covered most of Scotland and Wales, the Northern Region, and most of Cornwall and North Devon.

The problems of the intermediate areas (of particular relevance to the Plymouth Survey) were first considered by the Hunt Committee whose report "The Intermediate Areas" (13) was published in 1969. After reviewing the problems of these areas the Committee set out a series of proposals for government assistance. The government did not accept all of these recommendations, but they did (in the Local Employment Act 1970), designate certain intermediate areas which could qualify for limited assistance. The list of intermediate areas was extended in 1972 to comprise the whole of the North West outside the development areas, the Yorkshire and Humberside Planning Regions, parts of the Nottingham and Derby coalfields, those parts of Wales not in a development area, Plymouth, and Leith.

At this point, reference to Figure 4.5, which shows the main regional spread of the Plymouth Survey sample firms,

Fig. 4.5 Main Regional Distribution Area of the Plymouth Survey Sample



Source: Plymouth Survey Questionnaires, Question 2. Dept. of Industry, "The Areas for Expansion" Map, Millbank, London, 1977.

Of the total 65 firms, 4 companies (6%) were in the Cornwall Development Area; 36 (55%) were in the main Plymouth

Intermediate Area; and 25 (38%) were outside the assisted areas altogether. Thus, a reasonable spread of firms with regard to the South West (Plymouth) region was established.

Broadly speaking, the government was to assist in the above areas in the following ways. Firms could benefit from countrywide taxation allowances on capital expenditure. In order to promote economic growth and the modernisation of industry the 100% first year depreciation allowance for investment in plant and machinery for use in both manufacturing and service industries, previously only in development areas, was extended to cover the whole country and there was also an initial 40% tax allowance on new industrial buildings.

In the assisted areas these basic investment incentives were supplemented under the Industry Act by a new system of regional development grants. These were cash grants towards the cost of plant, machinery, buildings, and works on premises used wholly or mainly for specified qualifying activities, in manufacturing, construction, and mining. Unlike the building and operational grants formerly available under the Local Employment Acts, the new grants would not be limited to projects creating employment, and thus would be available to help with investment to improve and modernise. In addition, they would not be treated as reducing the capital expenditure which qualified for capital allowances for tax purposes.

Table 4.11 Investment Incentives

Taxation Allowances Countrywide	
All Plant and machinery (new and second hand - other than passenger cars) for use in both services and manufacturing.	First year allowance 100%

Table 4.11 (Continued)

New industrial building and structures	Initial allowance 40% and writing down allowance 4%

Regional Development Grants in Assisted Areas

	Plant, Machinery, and Mining Works	Buildings
Special Development Areas	22%	22%
Development Areas	20%	20%
Intermediate Areas		20%
Derelict Land Clearance (For two years only)		20%

Source: Economic Progress Report; Information Division of the Treasury, No. 32, October 1972.

The Industry Act also provided for selective financial assistance for projects likely to promote, maintain, or safeguard employment in any part of the assisted areas.

Other forms of incentive included factories for sale or rent, grants for training workers, transfer assistance, and regional employment premiums.

Direct control on location of industry was to be by the continuance of industrial development certificates, although these would not be applicable in the development and special development areas. An Industrial Development Executive was set up incorporating the Industrial Development Unit plus an Industrial Development Advisory Board - all to consider the possibilities of assistance to the regions.

This introduction has been necessary to demonstrate that since 1970, and particularly since 1972, investment incentives relevant to the Plymouth and surrounding areas had been available and improved. The question was - had the Plymouth Survey firms taken advantage of them to boost investment and profit? Had their investment strat-

egies been influenced by the possibilities of plant, machinery, and building grants? Interviewees were asked to what extent their investment decisions had been influenced by regional aid. Table 4.12 summarises the responses obtained.

INFLUENCE OF REGIONAL AID ON INVESTMENT

Table 4.12 Extent of Influence of Regional Aid on Investment. Plymouth Survey

Regional Aid:-	Employee Groups 0-24	25-99	100-199	200+	Totals
SIGNIFICANT influence on investment, e.g. grants enabled major building projects to proceed	1 (4%)	2 (11%)	2 (17%)	1 (11%)	6 (9%)
MARGINAL influence only, e.g. grants regarded as "bonus" after investment decision reached	6 (23%)	8 (44%)	3 (25%)	3 (33%)	20 (31%)
NIL influence. Grants too small; system unreliable; bureaucratically organised; aasistance not required, etc.	19 (73%)	8 (44%)	7 (58%)	5 (55%)	39 (60%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 54

Even allowing for the findings of the Taylor Nelson Survey (14) that tax allowances were a singularly unsuccessful means of encouraging investment, aspects of the above table are worthy of emphasis:

(i) Only 9% of the sample, the very small firms least of all, could claim that investment incentives of all kinds had had a significant influence on their capital expenditure decisions.

(ii) Although 31% of the firms said that their investment plans could be encouraged by regional aid, they nevertheless regarded this influence as marginal.

(iii) The investment decisions of 60% of the sample, with the smaller units again predominating, had clearly not been influenced in any way by government incentives.

However, since the table is, as usual, based on dominant responses only, supplemental extracts are provided below to elaborate.

"Cash via regional aid is not necessarily a relevant factor in the promotion of short run investment. Confidence in future markets is a more appropriate encouragement". (Code P1; Employees 486; Production Run Category C S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 54).

"We received a manufacturing and employment premium five years ago when our factory was rebuilt, but aid did not determine this decision - it was reached independently beforehand". (P2; 95; D; FDT; Brewing; PSQ,Q54).

"Regional aid could be a marginal influence only on our investment plans. Currently, trade is on the upturn (1975) and our premises are too small but the decision to expand or move depends entirely upon internal factors rather than government assistance". (P3; 50; C; FDT; Confectionery; PSQ,Q54).

"Regional policy tends to be too arbitrary, e.g. some areas qualify, others do not. But the real activity

lies within Plymouth and not Cornwall. However, even if comprehensive aid were available, investment would never be directly influenced by it alone". (P4; 600; D; FDT; Baby Food; PSQ,Q54).

"Since investment depends on basic need, regional aid tends to be largely irrelevant". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q54).

"Aid could help to determine the marginal investment but grants are changed from time to time, e.g. withdrawn. Thus, regional policy is unreliable". (P6; 450; D; FDT; Meat; PSQ,Q54).

"Although capital expenditure is not determined by regional aid it could influence the isolated investment decision, e.g. extensions to plant involving additional labour". (P7; 20; C; FDT; Minerals; PSQ,Q54).

"Investment would not be influenced by regional assistance even if we qualified. Capital spending is determined by factors within the firm itself rather than by a modest external grant which would be regarded simply as a bonus". (P8; 300; C; FDT; Bread; PSQ,Q54).

"Our investment has not been influenced to date by external aid. The rules tend to prohibit most claims, especially if small". (P9; 15; D; CAI; Fertiliser; PSQ, Q54).

"Operations and investment here have been on a minimal scale and regional aid has been an irrelevance". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q54).

"Government grants are not determinants of capital expenditure but they could be marginal influences if they were widely available, generous, and constant". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q54).

"We have actually used a regional building grant on our new extension in 1972, but this aid merely helped to arrive at the decision - it did not determine it, since we would have proceeded if the facility had not been available. Generally, regional policy is anomolous. For example, Bodmin is in a development area and we have a subsidiary firm there. Aid is available but there is no suitable labour. On the other hand, Plymouth has excess labour but no comprehensive grants. A reversal of regional policy in this instance would be beneficial and could promote investment here". (P13; 170; B; MME; Steelwork; PSQ,Q54).

"Training grants are useful but investment aid is too low to encourage capital expenditure in the machine tools industry". (P14; 468; B; MME; Machine Tools; PSQ, Q54).

"Aid does not determine investment. Plymouth has a restricted qualification but even in development areas, capital spending would be independent of regional policy". (P15; 14; B; MME; Industrial Signs; PSQ,Q54).

"No direct relationship exists between aid and investment. Grants would be regarded as a bonus only. Also, assistance tends to be recovered too late, after plant is completed, and problems of bridging loans arise". (P16; 10; C; MME; Press Tools; PSQ,Q54).

"Incentives would always be considered but building grants would be of little value here. The main investment incentive is our own profitability". (P17; 90; C; MME; Packaging Machinery; PSQ,Q54).

"Regional aid is irrelevant. Our building is rented and plant and machinery grants are not available. We export 90% of our work with no help from government sources". (P18; 12; a; MME; Ocean Cruisers; PSQ,Q54).

"We are entitled to building grants and these would be helpful but the legislation surrounding regional aid inhibits claims. The rules seem to be designed to keep applications down to a minimum. Nevertheless, we are proceeding with our new premises irrespective of assistance. Thus, investment here has not been vitally affected by regional policy". (P20; 120; B; MME; Boats; PSQ,Q54).

"Investment here has been on too small a scale to qualify for aid. Grants could possibly influence capital spending but the need to invest would have to exist beforehand". (P22; 21; B; MME; Boats; PSQ,Q54).

"If aid is available then this would be considered as a bonus. For example, in 1964 we received no grants for our 10,000 ft^2 extension. Similarly, no assistance was possible in 1967 for another 20,000 ft^2. But in 1970 some building aid was received, although this did not determine the further 22,000 ft^2. The decision to invest was quite separate from the possibilities of regional aid". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q54).

"Aid is not available in Plymouth on a sufficient scale to be effective. For example, we set up in the area in 1966 irrespective of regional assistance". (P28; 4; B; MME; Aluminium Castings; PSQ,Q54).

"Regional grants if available would never be regarded as actual determinants of investment, but could possibly influence the marginal decision". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q54).

"Our plant extension was influenced to some extent by available grants but the project would probably have gone ahead anyway". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q54).

"Unsure if we qualify for regional aid here, but if so, it would simply be regarded as an offset against expenditure already incurred". (P33; 3; A; MME; Luxury Yachts; PSQ,Q54).

"We could have set up our new factory in 1973 across the Tamar and qualified for assistance. We chose to locate in Plymouth instead where the activity is. Thus, our investment was not related to regional aid". (P34; 20; B; EE; Cold Rooms; PSQ,Q54).

"Regional aid has had some influence on our investment decisions. We could not have purchased all our equipment if grants had not been available in 1970. It is possible, however, that other forms of finance, e.g. hire purchase, might have been raised to have gone ahead if aid had not been available". (P36; 122; C; EE; Communication Equipment; PSQ,Q54).

"Investment here has not been influenced by regional aid". (P39; 800; D; TLCF; Footwear; PSQ,Q54).

"Our investment is determined by our own requirements. Regional aid could only be of minor influence on our capital spending decisions". (P40; 158; B; TLCF; Clothing; PSQ,Q54).

"The building is rented and no aid is available for plant and machinery. But training grants have been received. Thus, regional policy has not actually raised investment here". (P41; 150; C; TLCF; Clothing; PSQ,Q54).

"The firm is too small to take advantage of government aid, but it could be a relevant factor in respect of major decisions". (P43; 13; C; TLCF; Wet Suits; PSQ, Q54).

"We preferred to rent the premises rather than claim the building grant and have to raise the remainder through bank credit at a high cost of borrowing". (P44; 45; D; BPG; Glass; PSQ,Q54).

"Aid has had very little influence on investment to date because the latter has been minimal due to poor future prospects in the trade generally. Confidence is needed - not grants". (P46; 140; C; BPG; Pottery; PSQ, Q54).

"The firm is too small to take advantage of regional grants". (P49; 19; B; OMG; Blinds; PSQ,Q54).

"We have accepted the building grant for our new premises. The old factory was far too small and obsolete. Thus, although the grant was an incentive to invest, the move was imperative". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q54).

"Regional aid could be a help if we were to move to a new plant and extend operations considerably. But we have no funds to contribute, and the work load is insufficient to justify consideration". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q54).

"A building grant in 1972 made investment in our new urgently required plant possible. We could not have proceeded otherwise". (P52; 22; D; OMG; Coffins; PSQ,Q54).

"Aid tends to be designed to promote employment rather than the firm, and it could actually hinder if competition is encouraged to locate in the area". (P54; 24; B; OMG; Printing; PSQ,Q54).

"Aid has had no direct effect on our investment. We would have moved to our newly acquired premises regardless". (P55; 25; A; OMG; Vehicles; PSQ,Q54).

"Regional aid has not been employed here although we would very likely find it useful if the occasion arose". (P56; 50; B; OMG; Printing; PSQ,Q54).

"No aid is available. We are in manufacturing but part of our operation is classified as service. However, it is doubtful if regional grants would influence investment unduly". (P60; 106; C; OMG; Building Materials; PSQ, Q54).

"Regional aid would not influence investment unless the market opportunity was apparent beforehand. The assistance, on buildings only, would merely help the decision already taken. On the other hand, aid could, in fact, act as an investment deterrent. For example, we were the only firm in the area with a press shop and toolroom, and

we trained our own staff. New firms locating in the area, encouraged by government aid, gradually enticed this skilled labour away with better wages and conditions. Thus, regional policy has been no incentive for established companies in the area. Additionally, regional policy can place great strains upon local services". (P62; 400; C; OMG; Business Systems; PSQ,Q54).

These findings would appear to be of some importance. Regional aid is designed to ease the financial problems of firms in the encouragement of industrial investment, and the creation of employment in certain instances. But the majority of the Plymouth Survey firms were obviously only interested in regional aid when it actually coincided with their own plans for investment. If firms were investment optimising, then presumably they would be "aid-optimising" also. This was clearly not the case - a somewhat disturbing result. Even more important, however, is <u>why</u> this situation should prevail.

An apparent paradox within the extracts presented above, and the results obtained in Chapter 3, is that on the one hand firms ignored external grants for investment, whilst on the other hand firms specifically claimed that a major determinant of capital expenditure was profitability. Assuming that regional aid was a means of supplementing profit, why should firms reject this assistance?

The Plymouth Survey firms' reasons for this included:

(i) Aid was not always available for the purpose intended.

(ii) The firm could not raise the additional finance required to complement the grant.

(iii) Large scale investment had not been undertaken and aid was not needed.

(iv) Confidence in future markets with resultant profitability was psychologically more appealing.

(v) Aid was regarded as a bonus after the decision to invest had been reached.

(vi) The claiming of aid was too bureaucratically involved.

Indeed, the "Financial Times" (15) asked why small firms appeared to lose the fight for grants. The Industry Act was intended to help all firms in the eligible areas irrespective of size. The aid could amount to about £100 per worker in the development areas. Of course, not every firm with 100 employees would be eligible for £10,000 per annum. But whatever the potential benefit the large firms, whose grants could run into millions of pounds, were more likely to fill in the claim forms than the small ones. In fact, some large companies are known to employ full time staff to claim grants.

On the other hand, despite all the publicity from the Department of Trade and Industry, many small firms were unaware of the existence of the Industry Act - a point of some relevance to the Plymouth Survey. It would appear that certain legislation, intended to be neutral, favours large firms more than the smaller units. A large firm, for example, could purchase, say £1m of capital equipment and apply for a grant of up to £220,000. It could then claim tax allowances on the £1m saving a further £500,000. Thus, it would obtain £1m worth of equipment for £280,000. After a few years it could sell the equipment but the purchasers (probably small firms) could not get a grant on second hand items. They would only receive a capital allowance on the second hand price. The system automatically favours the bigger companies.

Moreover, a multi-national could set up a factory in Scotland with a grant for buildings and plant. If the new factory earned no profit in the first year, the company could claim tax allowances against the profits of

other divisions. Indeed, it would be wise to keep profit to a minimum to avoid corporation tax, and income tax on the dividends. However, any profit made could be shifted to another country by selling the product to an overseas associate below cost. Finally, the multi-national could make capital equipment in the new plant and sell it to an associate company who could then claim grants on the purchase. Clearly, small firms cannot compete with this kind of operation.

It is difficult to ascertain how small firms are faring with regional development grants, because the Industry Act does not require data about the size of companies applying for and receiving grants. But the implication raised by the Plymouth Survey data was that small firms were probably not benefitting from regional aid as intended.

Perhaps the system could be changed? For example, abolish all forms of grants, loans, and capital allowances against tax. Change corporation tax from a tax on profit to a tax on value added. Thus, companies with good profits would pay less tax than currently, and those with persistently low profits would actually pay more. This tax could be used as an instrument of government policy by having different rates of tax for different regions, industries, and sizes of firm. The system would be cheaper to operate than the present procedure. And since the Plymouth Survey firms claimed that investment depended basically on profit, it would hopefully stimulate capital spending in small businesses upon realisation that the more profit they made the less tax they would pay.

A further argument in support of the abolition of grants can be found in Table 4.13 below. In an "International Information Centre for Local Credit" publication, 1180 enterprises in the U.S.A. were asked to list the most

important reasons for their plant locations. Significantly, financial grants were accorded low priority.

Table 4.13 Reasons for Plant Locations

Plant Location most Influenced by:-	Voting - (several votes permitted)
Labour suitability	559
Markets	457
Buildings	394
Raw Materials	327
Less Trade Unionism	299
Climate	239
Transport Costs	230
Power	229
Other Firms	221
Financial Assistance	101

Source: International Information Centre for Local Credit. Government Measures for the Promotion of Regional Economic Development. The Hague, 1964, p 22.

Yet despite the evidence, and the obvious weaknesses of the regional aid procedure, it would be misleading to conclude that the U. K. system discriminated severely against small firms. Aid was available, and the Plymouth Survey firms had, in the main, declined to take full advantage of it. As a consequence, it was hardly likely that the companies under review were optimising their investment finance as far as regional aid was concerned.

SUMMARY

SOURCES OF FINANCE A considerable part of long term

finance for investment had been provided by the firms' own funds although the reliance on bank credit appeared to increase with the size of firm.

DIFFICULTIES IN RAISING INVESTMENT FUNDS For many of the firms in the sample, finance was usually available, and difficulties capable of being overcome, but they seemed most reluctant to take advantage of outside credit facilities.

EXTERNAL FINANCE Some 95% of the Plymouth Survey firms had not been concerned in any attempt to obtain finance through facilities beyond the local bank or other subsidiary sources, believing that such credit was a threat to their independence. Profits were likely to be impaired as a consequence of this approach.

GOVERNMENT INFLUENCE ON INVESTMENT Capital expenditure decisions were considered to be less influenced by government intervention in the smaller units than the larger. But excessively high corporation tax was universally claimed to erode profit earmarked for investment purposes.

EXPECTATIONS OF GOVERNMENTS Small firms' investment was more likely to respond to government action which impacted directly on profitability rather than policy which provided indirect, delayed, or unidentifiable financial assistance.

GOVERNMENT CREDIT CONTROL POLICY The 1971 government policy of credit control operated through the banking sector and had achieved very little in increasing long run investment in the sample firms.

INVESTMENT AND THE MINIMUM LENDING RATE A rising minimum lending rate would appear to reduce capital expenditure more than a falling cost of borrowing would increase it owing to the inelasticity of the marginal efficiency of capital schedule at high rates downwards. Monetary policy involving nominal changes in the MLR to influence investment favourably, had not enjoyed, and was unlikely to enjoy notable degrees of success.

REGIONAL AID Less than 10% of the Plymouth Survey firms, the very small ones least of all, could claim that investment incentives of all kinds had had a significant influence on their capital spending decisions. Aid was available, despite anomalies in the system, but firms had, in the main, declined to avail themselves of it. As a result, it was unlikely that the companies under review were optimising their investment finance in this respect.

REFERENCES

(1) Merrett Cyriax Associates, "Dynamics of Small Firms", Committee of Inquiry on Small Firms Research Report No. 12, Nov. 1971, H.M.S.O.

(2) "Small Firms", Report of the Committee of Inquiry on Small Firms, Chairman J. E. Bolton, Nov. 1971, Cmnd. 4811.

(3) A. Hankinson, "The Investment Behaviour of the Smaller Manufacturing Business Unit in the Plymouth Area 1970-1975", (The Plymouth Survey), Ph.D. Thesis, Univ. of Bath, unpublished as at 1977.

(4) Bolton Report, p 7.

(5) J. Irving, "The Cash is There for the Right Idea", Daily Telegraph, 19 July 1975.

(6) Bolton Report, p 151.

(7) (i) Bolton Report, p 152.
(ii) Economic Advisory Group, "Financial Facilities for Small Firms", Research Report No. 4, Nov. 71.
(iii) G. W. Golby and G. Jones, "Attitudes and Motivation", Research Report No. 7, Nov. 1971.
(iv) Economic Advisory Group, "Problems of the Small Firm in Raising External Finance - The Results of a Sample Survey", Research Report No. 5, Nov. 1971.

(8) "A Bleak View from the Boardroom", The Sunday Times, 26 Jan. 1975.

(9) "A Bleak View from the Boardroom", The Sunday Times, 26 Jan. 1975, (Forecast).

(10) "Competition and Credit Control", Bank of England Quarterly Bulletin, Sept. 1971, Dec. 1971, and subsequent issues.

(11) M. Friedman, "The Quantity Theory of Money: A Restatement", Studies in the Quantity Theory of Money, Chap. 1, Univ. of Chicago Press, Chicago, 1956, and "The Demand for Money: Some Theoretical and Empirical Results", Journal of Political Economy, 67, pp 327-351, 1959. Also, J. Harvey and M. Johnson, "An Introduction to Macro-Economics", Macmillan, 1971, Chaps. 10 and 15.

(12) W. F. Luttrell, "Factory Location and Industrial Movement", Vols. I & II, N.I.E.S.R., 1962.

(13) "The Intermediate Areas", Chairman, Sir J. Hunt, Cmnd. 3998, April 1969.

(14) Taylor Nelson Investment Services Research Article, "The Why and How of Company Investment", The Director, Nov. 1970.

(15) G. Wood, "Why Small Firms Lose the Fight for Grants", The Financial Times, 8 May 1973.

CHAPTER 5

INVESTMENT APPRAISAL STRATEGY

CHAPTER 5
INVESTMENT APPRAISAL STRATEGY

INVESTMENT APPRAISAL METHODS

An efficient and accurate means of appraising the worthwhileness of prospective investment is obviously essential for a firm which seeks to optimise profits, where all investments do not yield the same returns over the same period of time. The substitution of other objectives for that of optimality does not, however, negate the need for accurate investment appraisal, since it is virtually impossible to justify an intended investment subjectively except in circumstances where the potential economic returns are immaterial.

It remains surprising, therefore, how little attention has been paid to this area of a firm's operations within the United Kingdom. This has led to several commentators (1) to postulate a connection between the unscientific approach to investment appraisal and the slow rate of growth of the British economy post-war, during which period the vast bulk of published data on this subject has appeared. The evidence suggests that most firms have concentrated exclusively upon the "traditional" methods of appraisal namely variants of the pay-back method or the "rate of return" on capital employed method. These two approaches to investment appraisal have been viewed in an unfavourable light principally on the grounds

that they are either inaccurate, too conservative, or both, when compared with modern techniques such as the internal rate of return, or net present value.

The Plymouth Survey firms produced a variety of "calculations" but before examining these in tests of optimality, it might be helpful to set out briefly the traditional and modern methods of investment appraisal in order to avoid terminology confusion. Assessments of the strengths and weaknesses of these techniques will also follow in due course.

TRADITIONAL TECHNIQUES Virtually all economists and accountants would agree that the only acceptable way to choose between different investments is to use a discounting method of appraisal. In industry, however, it is probably the case that most of the methods employed are of the simple non-discounting type. To what extent this is true of the Plymouth Survey firms remains to be seen. The most important of these traditionals are: (i) payback; (ii) peak profit; (iii) average profit; (iv) rate of return methods.

PAYBACK METHOD Quite the simplest of all techniques used by industry, the payback method consists of selecting those projects whose profits are big enough to repay the amount invested within a chosen number of years, e.g. firms select projects where the capital cost is recouped within, say, 3 years. Therefore, faced with projects "A" and "B" below, where in both cases £200 is invested today (year 0) a firm using a 3 year payback would choose "A" and reject "B". "A's" profits have recouped the capital outlay in 3 years; "B's" profits have not. The most obvious advantage of such a method is its simplicity.

The Payback Method

Years	0	1	2	3	4	5	6	7
"A"	-200	60	60	80	40	20	-	-
"B"	-200	60	60	60	60	60	60	60

PEAK PROFIT METHOD The basis of this method is to take the level of profits in the best year and express it as a rate of return on the sum invested. Thus, the profit stream of project "A" below yields a peak profit rate of return of 60%, i.e. $\frac{120}{200}$ X 100.

Peak Profit Method

Years	0	1	2	3	4	5
"A"	-200	40	80	120	80	40
"B"	-200	100	100	100	100	100

The assumption behind this method is that the peak profit rate of return is in some way a guide to the average profitability of the project.

THE AVERAGE PROFIT METHOD The average profit method is the only major traditional method that takes account of profits over the whole of the project's life. The project's average profit level is expressed as a rate of return on the initial investment.

Average Profit Method

Years	0	1	2	3	4	5	Total Profit £	Average Profit £	Rate of Return %
"A"	-200	40	60	80	100	120	200	80	40
"B"	-200	120	100	60	60	40	190	76	38

For example, in the above, "A" is preferred to "B" since it has a higher rate of return.

RETURN ON CAPITAL EMPLOYED METHOD The principle of this method is to express profits as a percentage return on capital. The calculation is very simple as follows.

Return on Capital Employed Method

Years	0	1	2	3	4	5	Average R/R
"A"	-200	80	80	80	40	20	30%
"B"	-200	60	120	120	60	40	40%

Clearly, according to the method, "A's" 30% is regarded as inferior to "B's" 40%.

MODERN DISCOUNTED CASH FLOW METHODS Modern methods of investment appraisal all involve the principle of discounting. This is nothing more than the inverse of compounding where both methods seek to demonstrate the fact that a given sum of money in the future differs in terms of purchasing power from an identical sum today. Compounding gives the value in the future of a given sum today invested at various interest rates for varying periods of years, whereas discounting shows how much in present value terms any given sum accruing in the future is worth. All future cash flows can be discounted to their present value equivalents by means of the well known discounting formula:

$$\text{Gross P. V.} = \frac{A1}{(1+r)} + \frac{A2}{(1+r)^2} + \frac{A3}{(1+r)^3} + \ldots\ldots\ldots + \frac{An}{(1+r)^n}$$

where "A" represents expected net returns and "r" the discount rate. The formula can be summed into:

$$\sum_{m=0}^{m=n} \frac{Em}{(1+r)^m}$$

where "m" is the number of years of the project's life.

NET PRESENT VALUE METHODS When assessing the present value of money in a year's time, one must first find the amount that needs to be invested today in order to arrive at the given sum one year hence. For example, suppose there is a cash flow of £110 in year 1. To arrive at this

sum a firm would need to invest £100 today at 10%. In other words, the firm should be indifferent between £100 today and £110 in year 1 at a discount rate of 10%. It follows, therefore, that the £110 has a gross present value of £100. Following on from this, once all expected net returns in a stream have been discounted by the formula to their gross present value and summed the capital outlay must be subtracted to define net present value, i.e. G.P.V. - Outlay = N.P.V., or

$$N.P.V. = -\text{Outlay} + \frac{A1}{(1+r)} + \frac{A2}{(1+r)^2} + \frac{A3}{(1+r)^3} + \ldots\ldots \frac{An}{(1+r)^n}$$

Where the N.P.V. is positive in sign this can be taken to imply that the project is earning more than the rate of return by which the expected net returns were discounted. On the other hand if the N.P.V. is negative in sign this implies that the project is not earning as high a rate of return as that used for discounting purposes.

INTERNAL RATE OF RETURN The I.R.R. may be defined as that rate of interest which will discount the stream of expected net returns (expected returns less expected costs) into equivalence with the capital cost of the project. This is synonymous with a dsicount rate which produces a N.P.V. of zero. Unlike N.P.V., however, I.R.R. can only be calculated by some form of trial and error procedure although short cut techniques do exist (2). An example of an I.R.R. calculation is as follows:

Outlay Cash Flows

$$£500 = \frac{200}{(1.1)} + \frac{200}{(1.1)^2} + \frac{200}{(1.1)^3}$$

where 1.1 is derived from 1 + 10% which is itself arbitrary

$$500 = 181 + 165 + 150$$

$$500 = 496 \text{ (approximately)}$$

Thus, the I.R.R. is 10%, and where this rate is greater than the cost of borrowing, then the investment would be acceptable. But where the I.R.R. is less than the borrow-

ing cost of capital used in the project, then the investment would be rejected.

NET TERMINAL VALUE METHOD In the same way as one can value a project in terms of its value today (N.P.V) one can equally value its cash flow in terms of what it will be worth at the end of the project's life, i.e. the net terminal value. The formula for N.T.V. and its method of calulation are directly analogous to those for N.P.V.

$$N.T.V. = A1(1+r)^{n-1} + A2(1+r)^{n-2} + An\text{-}C(1+r)^{n}$$

A brief example is as follows:

Net Terminal Value Method

Years	0	1	2	3
Net cash flow	-100	50	50	50
Terminal values @ 10%	-133.1	60.5	55	50

N.T.V. = 60.6 + 55.0 + 50.0 -133.1 = 32.4

One simply calculates what each year's cash flow will have become worth by year 3 allowing for its being invested until then at 10% cumulative interest - assuming this to be the firm's marginal investment rate. On this basis, the positive cash flow sums to 165.5. This is called the project's gross terminal value. By contrast if the initial investment were invested at 10% it would cumulate to £133.1 by year 3. The project thus makes a surplus (N.T.V) of £32.4 compared with what would have been made if the £100 had been invested at the firm's marginal rate. The project is thus worthwhile. The difference between N.T.V. and N.P.V. is that the former cumulates forward to make a valuation at the end of the project's life while the latter discounts backwards to arrive at the present value.

ANNUAL VALUE METHOD The annual value method is, again, basically comparable with N.P.V. Instead, however, of calculating the value of the project over its whole life

the annual value method calculates the annual surplus which a project makes compared with its annual cost. Briefly, the basis of the method is that when assessing the annual capital cost of a project separate calculations are made for interest on capital and for a sinking fund to recoup the initial investment by the end of the project's life. The sinking fund involves calculating the amount which, when invested annually at the firm's marginal rate will yield by the end of the project's life a sum equal to the initial investment. Provided that the same interest rate is used for the sinking fund and for the interest on capital, the A.V.M. will give the same result as N.P.V. for accept or reject decisions.

INVESTMENT APPRAISAL AND THE PLYMOUTH SURVEY This cursory review of the better known investment appraisal methods, all purporting to give varying degrees of accuracy and suitability in the calculation of capital items, may now be applied to the Plymouth Survey. For example, how were investment projects actually calculated for viability? Were any of the above methods employed? How were cash flows assessed? How had the methods of investment appraisal and cash flow assessment been selected for use by the firms? Were any special factors, e.g. tax, risk, etc., taken into account in the calculations, and if so, how? Were there any actual examples of investment appraisal calculations available? To what extent did the firms improve their methods of appraisal? And finally, which major management techniques did the firms use generally? Thus, the objective of Chapter 5 is to assess investment optimality in the Plymouth Survey firms at the project appraisal stage.

COST OF CAPITAL

The Plymouth Survey firms were asked to state exactly how their capital projects were calculated for viability at the planning stage. Several problems arose, and the more important of these follow later, but a major difficulty revolved around the definition of the cost of capital when the phrase "discount rate" was used.

Curwen (3) points out that the cost of capital to a firm first of all depends upon the nature of the capital in question. Hawkins and Pearce (4) add that the economic cost of any specific source of capital will not necessarily equal the actual direct cost to the firm of financing the investment. The issue of extra fixed interest stock for example, may well change the risk of holding equities and hence alter their price because debt commitments are a prior liability on the firm. Since a firm will in general have a capital structure made up of part debt and part equity it follows that the cost of capital properly defined will be some weighted average of the costs of all the sources of capital which are used by the firm. This may be termed the overall cost of capital and will allow for the indirect effects of the issue of extra debt on the price of other stock. The cost of capital, according to Hawkins and Pearce must therefore reflect the effects of using a particular source of funds on other existing sources of capital.

But Curwen suggests that the usual meaning of the term is "equity cost of capital". It could be said that in theory firms are trying to maximise the present value of potentially available profits on behalf of the shareholders but they cannot do this unless they know this equity cost of capital. Firms could consider the need to have a comparable dividend record to those companies most

likely to be treated as alternative investments in the shareholder's mind. The cost of capital could be estimated in this way, but it does contain weaknesses, e.g. alternative firms may not be strictly comparable.

A most often quoted method is to be found in Merrett and Sykes (5) although the journals (6) have attacked it. Merrett and Sykes averaged out the returns to investors in a company over a recent period of a varying number of years. Included in the calculations were principally ordinary and preference shares, bonds, and retained earnings, and the computed average became the firm's cost of capital. Two main objections can be levied against the calculation. Firstly, Merrett and Sykes used a particular portfolio of shares and summed the results whereas the ordinary investor is more likely to appraise individual shares. And secondly, it is possible for firms to pay out dividends not from gross profits, but from retained earnings. This has produced the following conclusion from Pizzala (7). The approach developed for estimating the cost of capital is invalid as a guide to the future since it rests on the ability of companies to change their gross profit margins as tax and economic circumstances change in order to provide shareholders with an historically observed rate of return. The evidence would suggest that companies cannot hope to do this.

Sometimes the long term interest rate on debentures has been employed as the cost of capital. But Hawkins and Pearce feel that a more complicated formualtion is required. If overspill effects, i.e. the already referred to effects which different sources of capital will have on each other's prices, are ignored, then the cost of capital becomes a combination of: (i) the after tax interest rate on all forms of fixed interest loans; (ii) the best rate of return available were the shareholder

to invest his funds in the equity capital of another company known, of course, as the shareholder's opportunity cost of capital; and (iii) the value of retained earnings and depreciation provisions.

Concluding this discussion, it is clearly difficult to make any concrete statement about the meaning of the firm's cost of capital. The above merely touches on the subject, and much complicated argument remains. For example, with so much doubt surrounding the definition of the discounting factor, how valid is discounted cash flow? This issue, incidentally, is taken up subsequently. As far as the Plymouth Survey was concerned, the cost of capital had to be taken as that which individual firms either "calculated" or simply believed the cost to be.

CALCULATION OF INVESTMENT PROJECTS

In general terms discounting methods of investment appraisal have the obvious important advantage that they take into account: (i) the time pattern of cash flows; and (ii) the cost of finance. Other methods which do not take into account both of these factors must be considered to be inferior for most purposes. An exception to this could, of course, be that sometimes there might be a reason of overriding importance for investment which would make a precise evaluation of costs and return by any method inappropriate. Nevertheless, whilst rule of thumb investment appraisal techniques could be more than adequate for small firms on most occasions, over the longer term some profitable ventures could be missed, e.g. a firm giving priority to short run profit over long term cash flow. Of course, even if every firm did adopt rigorous approaches, it is not suggested here that all investments would reap maximum prof-

its. But firms would clearly be more aware, for instance, of the advantage of having cash flow assessed, especially in view of the fact that firms had made the point that liquidity was a major problem.

Bearing this in mind, how did the Plymouth Survey firms calculate their investment projects? The following series of tables and extracts attempt to summarise the rather complicated position. The complications arose as a result of the way in which some answers were given. For example, where firms were asked which method of investment appraisal they employed, basically two types of response emerged, i.e. (i) a specific method would be quoted, e.g. payback, or (ii) certain qualifications would accompany the first named technique, e.g. payback is employed but N.P.V. is adopted for major projects and occasionally as a checking device. The tables have thus been devised to show the most dominant methods used.

Table 5.1 Methods of Investment Appraisal with Emphasis on the Traditional Methods. Plymouth Survey

Investment Appraisal Method:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Payback	6 (23%)	2 (12%)	2 (17%)	1 (11%)	11 (18%)
Payback (flexible) (b)		1 (5%)		1 (11%)	2 (3%)
Payback with N.P.V. for major projects		1 (5%)		1 (11%)	2 (3%)
Payback with N.P.V. used for checking		1 (5%)	2 (17%)	1 (11%)	4 (6%)
Payback but no formal calculations employed (e)	5 (19%)	2 (12%)			7 (11%)

Table 5.1 (Continued)

Investment Appraisal Method:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Payback expressed as rate of return (c)	6 (23%)	7 (38%)	3 (25%)	2 (22%)	18 (28%)
Payback expressed as R/R but no formal calculations	1 (4%)				1 (1%)
Rate of Return	3 (11%)	1 (5%)	2 (17%)		6 (9%)
Rate of Return (flexible) (b)		1 (5%)			1 (1%)
Rate of Return with NPV as check	1 (4%)				1 (1%)
Rate of Return but no formal calculations (e)	1 (4%)				1 (1%)
SUB-TOTALS TRADITIONAL METHODS (a)	23 (88%)	16 (87%)	9 (76%)	6 (66%)	54 (82%)
Net Present value			3 (25%)	1 (11%)	4 (6%)
NVP/IRR				1 (11%)	1 (1%)
Internal Rate of Return				1 (11%)	1 (1%)
SUB-TOTALS MODERN METHODS (d)			3 (25%)	3 (33%)	6 (8%)
No formal calculations	3 (11%)	2 (12%)			5 (8%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires, Questions 62 & 63.

Notes to Table 5.1

(a) The figures reflect the use of the traditionals for main and subsidiary purposes, i.e. payback and rate of return techniques have been given a slightly inflated prominence which is compensated for in subsequent tables.

(b) A flexible payback (or rate of return) refers to the use of a variable payback (or rate of return) figure, e.g. rapid payback required for small outlays but a longer payback permitted for major projects.

(c) The payback and the rate of return methods can be regarded as the same for most purposes, e.g. a 4 year payback may be restated as a 25% rate of return.

(d) Four firms used N.P.V; one firm adopted a combination of N.P.V. and I.R.R; and another firm employed the I.R.R. specifically.

(e) Several firms employed no formal calculations, but it was clear from the discussions that decisions were based upon payback or the rate of return.

Table 5.2 Methods of Investment Appraisal with Emphasis on the Modern Techniques. Plymouth Survey

Investment Appraisal Method:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Net Present Value			3 (25%)	1 (11%)	4 (6%)
NPV for major projects		1 (5%)		1 (11%)	2 (3%)
NPV as checking device	1 (4%)	1 (5%)	2 (17%)	1 (11%)	5 (8%)
NPV/IRR				1 (11%)	1 (1%)
Internal Rate of Return				1 (11%)	1 (1%)
SUB-TOTALS MODERN METHODS	1 [4%]	2 [10%]	5 [42%]	5 [55%]	13 [19%]
Payback	6 (23%)	2 (12%)	2 (17%)	1 (11%)	11 (17%)

Table 5.2 (Continued)

Investment Appraisal Method:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Payback (flexible)		1 (5%)		1 (11%)	2 (3%)
Payback but no formal calculations	6 (23%)	2 (12%)			8 (12%)
Payback expressed as rate of return	6 (23%)	7 (38%)	3 (25%)	2 (22%)	18 (27%)
Rate of Return	3 (11%)	1 (5%)	2 (17%)		6 (9%)
Rate of Return (flexible)		1 (5%)			1 (1%)
Rate of Return but no formal calculations	1 (4%)				1 (1%)
SUB-TOTALS TRADITIONAL METHODS	22 (84%)	14 (77%)	7 (59%)	4 (44%)	47 (70%)
No formal calculations employed	3 (11%)	2 (12%)			5 (8%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Questions 62 & 63

Table 5.3 Methods of Investment Appraisal with Emphasis on the Absence of Formal Calculations. Plymouth Survey

Investment Appraisal Method:-	Employee Groups 0-24	25-99	100-199	200+	Totals
No formal calculations employed, e.g. necessity criterion	3 (11%)	2 (12%)			5 (8%)

Table 5.3 (Continued)

Investment Appraisal Method:-	Employee Groups 0-24	25-99	100-199	200+	Totals
No formal calculations but payback principally	5 (19%)	2 (12%)			7 (11%)
No formal calculations but rate of return used	1 (4%)				1 (1%)
No formal calculations but payback expressed as rate of return used	1 (4%)				1 (1%)
SUB-TOTALS ABSENCE OF FORMAL CALCULATION	10 (38%)	4 (24%)			14 (21%)
Payback	6 (23%)	2 (12%)	2 (17%)	1 (11%)	11 (17%)
Payback (flexible)		1 (5%)		1 (11%)	2 (3%)
Payback expressed as rate of return	6 (23%)	7 (38%)	3 (25%)	2 (22%)	18 (27%)
Rate of return	3 (11%)	1 (5%)	2 (17%)		6 (9%)
Rate of return (flexible)		1 (5%)			1 (1%)
SUB-TOTALS TRADITIONAL METHODS	15 (57%)	12 (65%)	7 (59%)	4 (44%)	38 (57%)
N.P.V.			3 (25%)	1 (11%)	4 (6%)
N.P.V. for major projects		1 (5%)		1 (11%)	2 (3%)
N.P.V. as checking device	1 (4%)	1 (5%)	2 (17%)	1 (11%)	5 (8%)

Table 5.3 (Continued)

Investment Appraisal Method:-	Employee Groups 0-24	25-99	100-199	200+	Totals
NPV/IRR				1 (11%)	1 (1%)
Internal rate of return				1 (11%)	1 (1%)
SUB-TOTALS MODERN METHODS	1 (4%)	2 (10%)	5 (42%)	5 (55%)	13 (19%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Questions 62 & 63

Table 5.4 Consolidated Summary of the Main Investment Appraisal Methods Employed by the Plymouth Survey Firms

Investment Appraisal Method:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Traditional	18 (69%)	13 (72%)	8 (67%)	5 (55%)	44 (68%)
Modern	1 (4%)	2 (12%)	4 (33%)	4 (44%)	11 (17%)
No formal calculations employed.	7 (27%)	3 (17%)			10 (15%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Questions 62 and 63

The findings of the already referred to Taylor Nelson Survey (8) are particularly relevant at this stage. It will be recalled that Taylor Nelson Services conducted a survey of the pattern of industrial investment in the United Kingdom covering all sizes of firm and reported by them in "The Director" of November 1970. The study covered 83 firms of which 14 were large with capital of £50m and over; 37 were medium with capital between £10m and £49m; and 32 were small with capital of less than £10m. Since the selection of the size of firm was by asset level

rather than employees, some difficulty of comparison with the Plymouth Survey is obvious. However, the Taylor Nelson Survey small firms were considered to be reasonably compatible with the type of firm included in the Plymouth Survey. Table 5.5 below presents the Taylor Nelson findings on investment appraisal methods employed by firms in that study.

Table 5.5 Main Methods Used for Evaluating Capital Expenditure Projects. Taylor Nelson Survey

Investment Appraisal Method	Size of Company			
	Small	Medium	Large	Totals
Payback	12 (38%)	9 (24%)	3 (22%)	24 (29%)
Rate of Return	6 (19%)	10 (27%)	4 (28%)	20 (24%)
SUB-TOTALS TRADITIONAL METHODS USED	18 (57%)	19 (51%)	7 (50%)	44 (53%)
Net Present Value	2 (6%)	2 (6%)	2 (15%)	6 (7%)
Internal Rate of Return	7 (22%)	12 (32%)	4 (28%)	23 (28%)
SUB-TOTALS MODERN METHODS EMPLOYED	9 (28%)	14 (38%)	6 (43%)	29 (35%)
No formal calculations employed	5 (15%)	4 (11%)	1 (7%)	10 (12%)
Totals:-	32	37	14	83

Source: Taylor Nelson Services, "The Why and the How of Company Investment", The Director, November 1970.

Finally, a comparison of the investment appraisal methods

used by the Plymouth Survey firms and the small firms only in the Taylor Nelson Survey is presented in Table 5.6.

Table 5.6 Comparison of Investment Appraisal Methods used by the Plymouth Survey Firms and the Small Firms only in the Taylor Nelson Survey

Investment Appraisal Method:-	Plymouth Survey Firms	Taylor Nelson Small Firms Only
Traditional	44 (68%)	18 (57%)
Modern	11 (17%)	9 (28%)
No formal calcs.	10 (15%)	5 (15%)
Totals:-	65	32

Sources: Plymouth Survey Questionnaires; Questions 62 and 63. Taylor Nelson Survey, The Director, November 1970.

This whole aspect of investment appraisal was regarded as a fairly vital area and the tabular data would require some comment. It was suspected at the hypothesis stage that small firms did not employ rigorous investment appraisal techniques or calculations and to some extent this was confirmed. But it must be noted that the rate of return or payback, however ascertained, was not always the crucial factor, e.g. when the "necessity criterion" was applied in situations described in Chapter 3. It is probably accurate to state that where firms adopted trial and error methods these tended to be suitable and adequate for their purposes. This is not to say, of course, that such an approach would be wise for larger and more committed business units.

The tables indicate that the payback and the rate of return methods were by far the most popular used by

the firms. When these traditional methods were given emphasis, i.e. main and subsidiary usage, some 82% of the sample was involved, but the smaller companies relied more heavily on these simpler techniques than the larger. When modern methods were awarded prominence, only 19% used N.P.V. or I.R.R., either mainly or occasionally, and the use of these systems intensified with the size of firm. However, only two firms used the I.R.R. as a major method of appraisal, the rest tended to employ the techniques as checking devices or for major projects only. But a notable feature of the table highlighting the absence of formal calculation (Table 5.3) was that 21% of the sample admitted to this deficiency, and a rather high 38% of the very small firms predominated here.

The consolidated schedule of the main methods used by the Plymouth Survey firms confirmed that 68% used the traditional techniques; 17% employed N.P.V. or I.R.R; and 15% used trial and error methods or none at all. By comparison, in the Taylor Nelson Survey some 57% of the small firms used payback or a rate of return calculation; 28% were employing N.P.V. or I.R.R; and similar to the Plymouth Survey, 15% used no formal criteria.

Taylor Nelson also revealed that even the large companies were not automatically pro-D.C.F., e.g. 53% used the traditional methods. And D.C.F. was not overwhelmingly popular with fast growing concerns who felt that the extra work involved in D.C.F. was not justified. However, perhaps not surprisingly, more Taylor Nelson companies turned to D.C.F. furing tight money periods. Additionally, a small number of firms tended to regard D.C.F. as a checking device rather than a final arbiter, a technique also adopted by some of the Plymouth firms. Indeed, several of these latter firms, as already indicated, used more than one technique depending on the nature

and importance of the investment in question. They also occasionally expressed one method's results in terms of another. The following individual comments by the Plymouth Survey interviewees on the calculation of investment projects in their particular firms, develop these points more fully.

"The payback method is always adopted for basic investment, e.g. cost of machine + costs of operation - production value set against the existing output, i.e. the net reward from the increased production is calculated. On the other hand, if a very large project is to be undertaken, e.g. new factory base, then D.C.F. would be employed". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 62 and 63).

"Historically, the payback method has always been used. More recently the parent has introduced N.P.V. It is unlikely that the Plymouth unit would have brought this into operation itself". (P2; 95; D; FDT; Brewing; PSQ,Q62 and 63).

"Investment projects are assessed by a simple net rate of return on outlay calculation. This return must be 25% or 4 years payback. D.C.F. is not used as major capital expenditure tends to be infrequent". (P3; 50; C; FDT; Confectionery; PSQ,Q62 and 63).

"Some D.C.F. is employed but investment appraisal is mainly by simple payback despite the fact that the latter can be misleading, e.g. it is usually the case that if a project produces a good first year then teething troubles tend to be overlooked. In other words, speedy production overshadows the breakdowns. The procedure here is to expect little return in the first five years on a major project. This is regarded as the main risk phase. Most profit tends to flow in the second five year period. Sometimes losses have been experienced in the early stages but a break-even achieved in the third year and the losses recouped by the fifth. This whole approach is really based upon the payback method". (P4; 600; D; FDT; Baby Food; PSQ,Q62 and 63).

"Capital expenditure is assessed by a rate of return approach based upon the extra units produced at a price, less the cost of production, all expressed as a

percentage of the outlay. But no formal calculation is carried out. Basically, investment would always proceed if considered to be necessary". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q62 and 63).

"D.C.F. has been recently adopted for major capital items, i.e. the internal rate of return. Not sure of the mathematical problems, e.g. multiple roots, or the general weaknesses of the method". (P6; 450; D; FDT; Meat; PSQ,Q62 and 63).

"No formal investment appraisal method is adopted here although a usual test is the speed of the outlay recovered, i.e. payback. Not familiar with D.C.F. or the problems associated with the method. Alternative projects are rarely considered along with the capital item in question". (P7; 20; C; FDT; Minerals; PSQ,Q62 and 63).

"The payback technique is employed but this is converted into a rate of return percentage. For instance, the savings from repairs to a vehicle are estimated over, say 5 years (or 20% rate of return) and these are expressed as a percentage of the outlay less depreciation.

$$R/R = \frac{(S1 + S2 + S3 + S4 + S5) / 5}{\text{Outlay} / 2} \times 100$$

Investment tends to be mainly of a repair and maintenance nature, but in fact, all capital expenditure is assessed on a simple payback basis". (P8; 300; C; FDT; Bread; PSQ,Q62 and 63).

"Investment projects are not calculated as such although an assessment is made to see which machine of the range available would best serve the purpose. But a rate of return is not always the vital point. The need to invest is the crucial test. However, since we would hope to recover the outlay as soon as possible then an implied payback is really in operation". (P9; 15; D; CAI; Fertiliser; PSQ,Q62 and 63).

"Since most investment tends to be repeatable, capital items are appraised by assessing current requirements with what has gone before. A rate of return calculation has been traditionally adopted by this unit and by the parent for most purposes, although D.C.F. has been employed if the expenditure has exceeded £10,000. For items below this figure, a simple rate of return calculation would involve:

$$R/R = \frac{\text{Profit before taxation}}{\text{Capital employed}} \times 100$$

For example, using figures taken from the documents supplied:-

$$R/R = \frac{\text{Sum of cash flows}}{\text{Capital employed}} \times 100 = \frac{£3120}{£8129} \times 100 = 38.4\%$$

(P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q62 and 63).

"The payback is used along with D.C.F. acting more as a check rather than as a specific method. Alternative projects are rarely considered". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q62 and 63).

"Capital projects are assessed in relation to the likelihood of achieving certain required aims, e.g. raised output. A rate of return calculation is produced involving the estimated net savings from this raised output, and expressed as a percentage of the outlay adjusted for depreciation. Usually only one machine type is considered; alternative projects are largely irrelevant". (P12; 8; C; MME; Injection Moulds; PSQ,Q62 and 63).

"A net profit figure on outlay invested at the firm's marginal rate is required prior to capital item's being approved. The N.P.V. method provides such a figure. But not familiar with N.P.V. crossover problems or with the I.R.R. in general". (P13; 170; B; Steelwork; PSQ,Q62 and 63).

"Investment projects are appraised by the N.P.V. method although a 5 year maximum payback or 20% rate of return applies in most cases. Unaware of the I.R.R. or D.C.F. mathematical weaknesses". (P14; 468; B; MME; Machine Tools; PSQ,Q62 and 63).

"We usually only require, say $\frac{1}{2}$ a machine, and the initial consideration would be whether the machine to be purchased would justify the expense at 50% operation. Basically, a payback approach is adopted for this, but it is not done in a formal way. A trial and error system is used. Also, no large scale investment is required and thus there is little need for mathematical techniques". (P15; 14; B; MME; Industrial Signs; PSQ,Q62 and 63).

"No investment appraisal calculations are undertaken and none of the traditional or modern techniques are used. Aware of the payback and rate of return methods but not familiar with D.C.F". (P16; 10; C; MME; Press Tools; PSQ,Q62 and 63).

"The speed of outlay recovery is a major factor but if the investment is vital then rates of return are subsidiary. Appraisals are not set out in schedule form but a payback figure expressed as a rate of return is calculated". (P17; 90; C; MME; Packaging Machinery; PSQ, Q62 and 63).

"No major investment has been undertaken recently and thus there has been no need for formal calculations. The decisive test is whether the item is required or not. Not aware of any of the modern techniques of investment appraisal, but the payback and rate of return methods are known". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q62 and 63).

"The decision to invest is largely a question of how soon the capital can be recovered. This payback figure is usually converted into a rate of return percentage. Investment also tends to be rather specific here, and thus no alternative project comparisons are necessary". (P19; 60; B; MME; Boats; PSQ,Q62 and 63).

"A payback standard of 5 years is adopted or 20% return on capital. Also, the extra turnover generated by the new investment is expected to yield a 9%+ profit in net terms. Heard of D.C.F., N.P.V., and the I.R.R. but the methods have never been employed. In any event where investment is of necessity, even the payback/rate of return criterion is of less importance, unless considerably in excess of 5 years". (P20; 120; B; MME; Luxury Boats; PSQ,Q62 and 63).

"No formal calculations are adopted for investments as the main items tend to be in labour rather than in equipment. Labour investment is influenced by work potential and none of the normal methods of investment appraisal are applicable. For example, there is no requirement for a payback standard except possibly in the longer term, but even here, there is no record of representatives being withdrawn as a result of work downturns". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q62 and 63).

"Payback is employed. Aware of N.P.V. but not the I.R.R. Not familiar with the problems of D.C.F." (P22; 21; B; MME; Boats; PSQ,Q62 and 63).

"No formal calculations are carried out but an average rate of return assessment is made, i.e.

$$\frac{\text{Total Savings / Years}}{\text{Outlay}} \times 100 = \text{Rate of Return}$$

Not aware of the N.P.V. or the I.R.R. or the problems associated with these methods. Alternative projects do not normally arise". (P23; 50; B; MME; Iron Castings; PSQ,Q62 and 63).

"Investment tends to be specific, i.e. only one capital project considered, and the payback is an adequate means of measuring the rate of return required. Aware of D.C.F., unsure of the I.R.R., but not aware of the mathematical problems of modern investment appraisal methods generally". (P24; 200; C; MME; Toolmaking; PSQ, Q62 and 63).

"The payback method would be used for capital projects but with flexibility applied depending on the nature of the investment. A slow payback would be permitted for expensive items, whilst a quicker return would be expected for, say miscellaneous machinery, e.g. grinders. The initial appraisal is based upon a replacement approach. Is there too much sub-contracting? How much would be saved by the installation of capital equipment to reduce or eliminate outside contracts? The payback figure is basically the result of balancing the expenditure of the former with the savings of the latter". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q62 and 63).

"Although there has been little current investment, usually a specific machine is purchased and few alternatives are considered. Repairs and maintenance are treated similarly. Consequently, there is no pressing need for sophisticated methods of investment appraisal and the payback, expressed as rate of return, is adopted for all purposes. Heard of D.C.F. but not familiar with the mechanics of the technique or the several methods based upon it". (P26; 70; A; MME; Trawler Repairs; PSQ, Q62 and 63).

"Replacement would involve no formal calculations but vertical investment would be assessed by payback. Aware of D.C.F. but not the mathematical problems. Modern methods have never been applied here". (P27; 40; D; MME; Thermowells; PSQ,Q62 and 63).

"Payback (as a percentage) is the technique adopted for the appraisal of capital projects. The calculations take into account the estimated contribution to improved production, e.g. the value of "X" units @ a price over "n" years against costs and residual available

to repay outlay". (P28; 4; B; MME; Aluminium Castings; PSQ,Q62 and 63).

"Investment projects are calculated on a payback basis converted into a percentage rate of return. D.C.F. techniques are known but not applied. Not familiar with all the modern techniques or the claimed weaknesses, e.g. multiple roots of the I.R.R". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q62 and 63).

"Investment is usually of the one-off type, e.g. new air cleaning process, and alternative projects are few. Two approaches are adopted for capital projects: (i) small items (less than £1,000) are expected to repay within 18 months, and (ii) large (over £1,000) outlays are allowed 4 to 5 years payback. Aware of D.C.F. etc., but there has been no need to apply this technique here. Not aware of the comparison of investment appraisal methods problem or the mathematical pitfalls of the N.P.V. or I.R.R." (P30; 30; B; MME; Ford Petrol Conversion Engines; PSQ,Q62 and 63).

"D.C.F. is used, i.e. N.P.V., but capital viability is basically a question of payback. Many factors would be non-measurable, e.g. returns from introducing a safety element such as a harness. Will it pay? Is it necessary? These are the vital issues rather than the method of investment appraisal". (P31; 50; B; MME; Steelwork; PSQ,Q62 and 63).

"Investments are appraised by payback, but D.C.F. has been used as a checking device when projects have been major, expensive, or both. Not aware of the demerits of D.C.F. methods". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q62 and 63).

"No large investment projects have been carried out recently, but minor capital items have been assessed on a trial and error basis and a simple return on capital produced, e.g.

$$\frac{\text{Profit}}{\text{Outlay}} \times 100 = \text{R/R\%}$$

Also, the break-even payback point would be estimated. No records are kept. Not aware of D.C.F". (P33; 3; A; MME; Luxury Yachts; PSQ,Q62 and 63).

"Capital projects are appraised on a standard payback basis, e.g. 4 years or 25% for major items, and 2 years or 50% for minor, such as lorries. Not aware of N.P.V. or I.R.R. ever being employed". (P34; 20; B; EE; Cold Rooms; PSQ,Q62 and 63).

"After the decision to go ahead has been taken on a capital item, a rate of return is then calculated. No use has been made of D.C.F. Only on rare occasions have there been alternative projects to consider". (P35; 20; B; EE; Electric Motors; PSQ,Q62 and 63).

"Specific machines are usually selected and purchased on a payback/rate of return basis. Vital to adopt this break-even method in the early stages. Aware of D.C.F. but not the I.R.R. or the problems of the various D.C.F. methods generally". (P36; 122; C; EE; Communication Equipment; PSQ,Q62 and 63).

"Investment appraisal usually proceeds on a simple rate of return calculation, e.g. $R/R = \frac{\text{Total Profit}}{\text{Outlay}} \times 100$

This method has been found to be suitable since, for example, there are usually no alternative projects under review. Heard of D.C.F. but not aware of the problems, and none of the various methods have been tried. In any event, there would be no need for advanced calculations in respect of repairs and maintenance". (P37; 27; C; EE; Location Systems; PSQ,Q62 and 63).

"Investment tends to be rather specific in that one particular machine, for example, is selected for the purpose intended. Thus, D.C.F. or rigorous mathematics are not strictly necessary. But a payback or rate of return percentage is calculated. Not aware of the alleged pitfalls of the various investment appraisal methods". (P38; 8; B; EE; Control Panels; PSQ,Q62 and 63).

"An annual budget on a 3 year plan is produced each September and all local units are responsible for their own investment decisions. Traditionally, the payback has been employed. Not too familiar with the mechanics of the other methods of investment appraisal apart from the simple rate of return calculation. Heard of the N.P.V. and the I.R.R. but these have never been employed directly in the branches". (P39; 800; D; TLCF; Footwear; PSQ,Q62 and 63).

"The speed of return of the outlay is the criterion upon which investment projects are based, i.e. the payback method. Not aware of the N.P.V., I.R.R., etc., and also not aware of the confusion caused by the using of alternative methods of appraisal". (P40; 158; B; TLCF; Clothing; PSQ,Q62 and 63).

"Although specific capital items are usually purchased as they are required, a standard N.P.V. figure is calculated for most investment purposes. Not aware of the I.R.R., the multiple roots problem, or the anomaly arising from the using of different discount rates in the calculation of the N.P.V". (P41; 150; C; TLCF; Clothing; PSQ,Q62 and 63).

"The decision to invest is influenced mainly by the degree of necessity, e.g. if the item becomes obsolete then it is replaced. But investments are actually appraised by the payback method, e.g. vehicles, cranes, etc., are expected to pay for themselves over their working lives". (P44; 45; D; BPG; Glass; PSQ,Q62 and 63).

"No real method of investment appraisal is employed except for an estimated rate of return calculation. Not familiar with D.C.F. but on the other hand, not convinced that investment decisions are affected favourably by advanced investment appraisal methods". (P45; 23; C; BPG; Pottery; PSQ,Q62 and 63).

"Capital expenditure is usually based on know-how, trial and error, etc. No schedules of alternative projects are drawn up. Aware of D.C.F. but the technique is not used here. The main question is how soon the outlay can be recovered. Thus an implied payback is in operation". (P46; 140; C; BPG; Pottery; PSQ,Q62 and 63).

"Investment project viability is based upon previous records of returns from the item in question, and a variable rate of return is adopted according to the need. Aware of D.C.F. but not the mechanics of the technique. Unsure of the contribution which a sophisticated investment appraisal method would have on the investment decision". (P48; 25; C; OMG; Furniture; PSQ,Q62 and 63).

"Capital items depend upon the relative importance of the new asset to the firm, and although the payback/rate of return methods are used, the returns could be 0% or 100%. Not sure about D.C.F. or the problems associated with it, e.g. multiple roots for I.R.R., and alternative discount rates for N.P.V". (P49; 19; B; OMG; Blinds; PSQ,Q62 and 63).

"No set investment appraisal method is used and no alternative projects are considered. If the new machine is needed and is believed to be capable of doing the work intended, then the rate of return is assumed to be adequate". (P50; 44; C; OMG; Cardboard Containers; PSQ, Q62 and 63).

"The payback method is adopted, i.e. the speed of the recovery of the outlay from, say, improved labour productivity. The decision to proceed rests on this payback figure although occasionally a machine has to be obtained after a contract has already been signed. Capital costs are assumed to be constant during the payback period and no depreciation is taken into account in the investment appraisal calculation. Not familiar with D.C.F. or the problems linked with the technique. Alternative projects are unlikely". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q62 and 63).

"Payback is used. Small firms have no real need for advanced investment appraisal methods". (P52; 22; D; OMG; Coffins; PSQ,Q62 and 63).

"Investment proceeds by instinct. If an item is required, then it is obtained (alternatives are irrelevant in printing) and no mathematics are needed. Not familiar with the various investment appraisal methods except the concept of the simple payback idea. But no formal calculations are undertaken here". (P54; 24; B; OMG; Printing; PSQ,Q62 and 63).

"Usually no formal calculations proceed the acquisition of a capital item. More often than not there is only one specific piece of appropriate equipment such as the new gantry, for our special needs. As the gantry was required, and its usage was likely to be full time, then the spending was quickly approved. None of the usual investment appraisal methods was of relevance". (P55; 25; A; OMG; Vehicles; PSQ,Q62 and 63).

"No formal method of calculation is used. But subconsciously, we would have a payback period in mind otherwise the machine would not be purchased. However, on rare occasions when equipment has to be quickly replaced, e.g. following breakdowns, then the rate of return is of less importance". (P56; 50; B; OMG; Printing; PSQ,Q62 and 63).

"Investment has been appraised principally on a break-even basis, i.e. payback. D.C.F. has also been applied in a checking capacity although there is no immediate evidence to confirm this. Not aware of the D.C.F. mathematics problems, etc., but since investment tends to be piecemeal here, e.g. no alternative projects considered, then D.C.F. may be disregarded along with the problems". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q62 and 63).

"N.P.V. is adopted but expressed in both payback and rate of return form. The calculations can apply to purchase, hire purchase, and leasing. Alternative proects are not as a rule included". (P60; 106; C; OMG; Building Materials; PSQ,Q62 and 63).

"Capital expenditure is assessed for viability by the present value method expressed in yield form, although the I.R.R. has never been used officially. Aware of the problem of using different discount rates yet only two are actually applied, alternative projects are not considered, and no investment appraisal method comparisons are made. The N.P.V. is found by interpolation and the resulting percentage is quoted as the yield. Thus, the I.R.R. is employed but indirectly". (P62; 400; C; OMG; Business Systems; PSQ,Q62 and 63).

"Investment appraisal is undertaken by means of break-even calculations where the costs saved are balanced against the old costs, i.e. an opportunity cost approach. Generally, the firm is prepared to sacrifice short run gains for long run potential, e.g. short run cost of safety equipment is considered to be less than the subjective long run gains. Thus, payback is used but with flexibility". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q62 and 63).

"Returns from investment tend to be unpredictable and we do not pursue a formal policy of investment appraisal. If anything, a payback and rate of return approach is adopted but we can only make 'guestimates' at best. Aware of the importance of cash flow measurement, but D.C.F. has never been used. For example:

Marquee cost £2,000; Expected life 10 years; Depreciation assumed to be constant; Rent (income) £400 per annum.
Then: $\frac{400}{1000} \times 100 = 40\%$ rate of return or $2\frac{1}{2}$ years P.B.

This is fundamentally the approach adopted". (P65; 30; B; OMG; Tents; PSQ,Q62 and 63).

Interestingly, much of the Plymouth Survey findings supported Taylor Nelson. But an issue of possible concern was the highly significant 68% + 15% and 57% + 15% of the firms in the two samples using unsophisticated techniques. In the Plymouth Survey the firms' attitudes tended to fall into two camps: (i) firms predominantly using the traditional methods believed that the quality of the investment

decision was not influenced by the quality of the investment appraisal method, whilst (ii) firms employing modern techniques conceded, with reservations, that the quality of the method could enhance the quality of the decision. However, it should be observed from the extracts that not all firms were able to distinguish one method from another, and indeed, in some respects certain confusions were evident. For example, several firms claimed no formal method of appraisal yet during discussions it was revealed that the payback was, in fact, in operation. Other companies employing modern techniques were by no means familiar with the mathematical problems inherent. One firm (P49) believed that under certain conditions the rate of return could range from 0% to 100%. And another company (P62) employing the yield method by N.P.V. interpolation, denied the use of the I.R.R. officially.

A further point to consider is the degree of awareness of D.C.F. displayed by the firms whilst not adopting the technique specifically. Of the 54 firms (83%) in the Plymouth Survey not using D.C.F. as a main method, 26 companies (48%) claimed to be aware of the importance of D.C.F. although in essence no firm in the entire sample was totally familiar with the pitfalls of the technique. Several interviewees pointed out that since alternative projects were rarely taken into account alongside the capital item in question, then D.C.F. was of limited relevance. But whilst this explanation might be adequate in the circumstances described, it did not excuse the failure to consider other investment opportunities.

It is possible, once again, that firms could be sub-optimising their investments and returns as a consequence of their inability, or even refusal, to employ more mathematical techniques. But to what extent do

modern methods of appraisal actually contribute to investment optimality? A review of the strengths and weaknesses of these techniques follow in due course, but for the present a schedule of the methods adopted by the Plymouth Survey firms highlights the fundamental issue of standardising the calculations in order to produce a meaningful "rate of return" criterion upon which to base the investment decision.

DIFFERENT INVESTMENT APPRAISAL METHODS - DIFFERENT RESULTS

It is already known that 68% of the Plymouth Survey firms used a traditional approach to investment appraisal; 17% adopted modern techniques; whilst 15% could claim no formal method. In summary, the calculations consisted of the following 7 basic methods:

(i) Payback
(ii) Average net rate of return on outlay
(iii) Rate of return on average outlay
(iv) Return per £1 outlay
(v) Average annual return per £1 outlay
(vi) Net present value
(vii) Internal rate of return

If, for example, we assume a £1,000 outlay, and cash flows over 3 years of (i) £400 (ii) £500 and (iii) £700, then the above methods produce the following results:

(i) Payback = 400 + 500 + 100 = 1000
Payback = $2\frac{1}{7}$ years
(ii) Average net rate of return on outlay = 20%

i.e. $\frac{600 / 3}{1000} \times 100 = 20\%$

(iii) Rate of return on average outlay = 40%

i.e. $\frac{(1600 - 1000) / 3}{1000 / 2} \times 100 = 40\%$

(iv) Return per £1 outlay = 160% or 1.6 ratio

i.e. $\frac{1600}{1000} \times 100 = 160\%$ or ratio of 1.6

(v) Average annual return per £1 outlay = 53.3% or 0.533 ratio

i.e. $\frac{1600 / 3}{1000} \times 100 = 53.3\%$ or 0.533 ratio

(vi) Net present value = £302 (@ 10% discount rate)

i.e. $-1000 + \frac{400}{1.1} + \frac{500}{(1.1)^2} + \frac{700}{(1.1)^3}$

$-1000 + 363 + 413 + 526 = 302$ N.P.V.

(vii) Internal rate of return = 25%

i.e. $1000 = \frac{400}{1.25} + \frac{500}{(1.25)^2} + \frac{700}{(1.25)^3}$

1000 = 998 (approx)

thus 25% is the I.R.R.

From this, since very few firms employed more than one technique, the fundamental problem of different results from different methods arose. And practically every firm in the sample was unaware of it. For example, if we assume an outlay of £10,000 for a project; a variety of possible cash flows; and the 7 methods in operation, then misleading results are inevitable as per Table 5.7

It will be observed that firms using the payback method would clearly find projects "A" and "D" the most attractive, whilst "C" would be ranked last of all. On the other hand, companies employing the average net rate of return, the rate of return on average outlay, or the return per £1 outlay techniques would disagree by placing project "A" sixth, and "C" first, along with "F". In short, a complete reversal. However those adopting

TABLE 5·7 INVESTMENT APPRAISAL METHODS. A COMPARISON OF RESULTS. PLYMOUTH SURVEY.

PROJECT	OUTLAY £	CASH FLOWS OVER 3 YEARS 1	2	3	PAYBACK YRS	RANK	AVERAGE NET RATE OF RETURN %	RANK	RATE OF RETURN ON AVE. OUTLAY %	RANK	RETURN PER £1 OUTLAY RATIO	RANK	AVERAGE ANNUAL RETURN PER £1 %	RANK	NET PRESENT VALUE @ 6% £	RANK	INTERNAL RATE OF RETURN %	RANK
A	10000	10000	-	-	1	(1)	0	6	0	6	1·0	6	100	(1)	-570	6	0	6
B	10000	5000	5000	5000	2	4	16·7	4	33·4	4	1·5	4	50	5	3365	5	23	5
C	10000	2000	4000	12000	2⅓	6	26·7	(1)	53·4	(1)	1·8	(1)	60	2	5526	2	27	3
D	10000	10000	3000	3000	1	(1)	20	3	40	3	1·6	3	53	4	4620	3	37	2
E	10000	6000	4000	5000	2	4	16·7	4	33·4	4	1·5	4	50	5	3448	4	24	4
F	10000	8000	8000	2000	1¼	3	26·7	(1)	53·4	(1)	1·8	(1)	60	2	6346	(1)	44	(1)

NOTES: TAXATION AND DEPRECIATION IGNORED. PROJECT VALUE ZERO AT END OF CASH FLOW PERIOD. EQUAL RISK PER PROJECT ASSUMED.

SOURCE: PLYMOUTH SURVEY QUESTIONNAIRES. QUESTIONS 62 AND 63 CALCULATIONS ARBITRARY

the average annual return per £1 outlay would tend to reinforce the result obtained by payback.

But the firms using net present value would support project "F" and, again, place "A" sixth. Importantly, the internal rate of return confirms this ranking.

From the table, of the six invented projects "F" is probably the best and "A" the worst, but two of the methods actually used by the Plymouth Survey firms would not produce this result. Of course, it is worthy of note that projects "A" and "D" do break even in the first year and the payback method highlights this advantage. But projects "F" and "C" produce profits of £8000 and the modern methods do take this into account. Project "A", of course, makes no profit.

Unfortunately, in at least one respect, the N.P.V. rankings should be viewed with caution since the results depend to a large extent upon the discount factor used, in this case an arbitrary 6%. A "crossover" problem can arise if the rate is changed. For example, if projects "C" and "D" are re-calculated for N.P.V. at, say 30%, then the results are "C" = -£604, and "D" = £831, which would reverse the rankings shown in the table.

Undoubtedly, whilst D.C.F. is to be recommended for most investment appraisal purposes, it can only be used with confidence if the user is familiar with the pitfalls. And no firm in the sample had more than a very slight awareness of these issues. Indeed, it might now be opportune to outline some of these mathematical problems.

A REVIEW OF D.C.F. STRENGTHS

N.P.V. is generally accepted by economists and accountants as being theoretically beyond criticism in that, if a firm wished to maximise profits, the use of this method would always produce the most viable project at the discount rate in question. On the other hand there has always been an element of doubt about the I.R.R. Fortunately, most of the problems with I.R.R. can be overcome by making certain modifications to the calculations. In the main, both the N.P.V. and the I.R.R., including their modifications, offer advantages which the firm not adopting D.C.F., would be well advised to note.

Discounting explicitly allows for the fact that £1 today is worth more than a £1 in the future through the use of increasing discount rates. Expected future returns will be reduced in value in the process of converting them into present day terms.

Secondly, discounting also helps to overcome the difficulty of choosing between projects which yield in total the same expected profit over a period, but where the bulk of the profits accrue in different years for competing projects. Obviously, since the rate at which expected profits are discounted rises, the further into the future we look, a project which earns most of the profit very quickly will have a greater N.P.V. or I.R.R. than a project which earns the bulk of the profit only after an initial lean spell (9).

Thirdly, D.C.F. methods automatically take into account depreciation. If the N.P.V. is positive this implies that the discounted returns exceed the capital cost of the project. Hence, the project both earns a profit and recovers all the original capital outlay. The I.R.R. gives that rate of return which exactly re-

covers the capital outlay. Thus, irrespective of the technique used, there is no need to allow explicitly for depreciation which is simply the traditional way of ensuring that the capital outlay is recovered.

Fourthly, it is possible to incorporate an allowance into D.C.F. for the effects of inflation. The net returns can be adjusted to allow for the expected trend in costs and prices. If these are predicted to move together then the D.C.F. calculation will not be affected. Where either costs or prices are expected to inflate irregularly, this too can be dealt with in the adjustment to the returns. However, the difficulties inherent in such adjustments are obvious but they become less and less important the further ahead projected.

And finally, D.C.F. techniques permit allowances to be made for taxation. Traditionally, taxation is simply deducted from total expected returns as a lump sum. In practice though, the taxation system does not operate uniformly over the life time of an investment. Various reliefs, as we have seen in Chapter 4, such as investment grants are often available over the early years, whereas taxation only becomes significant later on.

However, since D.C.F. calculations give most weight to the returns in the early years, the inclusion of grants and taxation will tend to boost the N.P.V. or I.R.R. to a greater value than where the average rate of taxation is levied on an annual basis in the calculation.

A REVIEW OF D.C.F. WEAKNESSES

The weaknesses of D.C.F. may be general to both N.P.V. and I.R.R. methods or may be specific to one rather than

the other. In any event, if the user is familiar with the pitfalls then avoiding action can usually be taken to render the calculations reliable. Unfortunately, none of the Plymouth Survey firms had studied comprehensively neither the methods nor the modifications to take full advantage of D.C.F.

If the N.P.V. and I.R.R. are used simply to reach a decision as to whether or not to undertake a given project in isolation then the results are immediately valid. But to treat prospective investments in isolation is not normally a true reflection of the situation facing most firms. Usually there will be a range of investment opportunities. This would create no problem if the firm had unlimited supplies of capital, since it would be able to undertake all the projects which satisfied the D.C.F. criteria. Very few firms, however, are in such a position, and indeed, restricted inputs could well prevent a company from carrying out any worthwhile project. Limitations on capital available would imply the need for ranking projects in declining order of acceptability. But, the best set of projects cannot always be reliably selected by choosing those with the highest N.P.V. or I.R.R. For a developed analysis of this issue Hague; Hawkins and Pearce; and Adelson (10) should be consulted. Even in a situation where a firm must choose only one from two possible investments, i.e. where they must be treated as mutually exclusive, the the N.P.V. and the I.R.R. criteria may produce conflicting recommendations.

Inconsistent N.P.V. and I.R.R. Results

Project	Outlay	Cash Flows			N.P.V.	I.R.R.
"A"	£10,000	2,000	4,000	12,000	£5520	27%
"B"	£10,000	10,000	3,000	3,000	£4620	37%

In the above presentation the N.P.V. method favours project "A" whilst the I.R.R. selects "B". But the problem is even more striking when the outlays are not identical. Curwen (11) provides the following example.

Inconsistent Outlays

Project	Outlay	Cash Flows				N.P.V. @ 10%	I.R.R.
"A"	£286	100	100	100	100	£31	15%
"B"	£130	50	50	50	50	£29	20%

The N.P.V. criterion would support project "A"; the I.R.R. would favour "B". The I.R.R. shows how much on average the project will yield per annum, but does not reveal how much it will yield in different years of its life. N.P.V. will be highest in the first few years and lowest at the end of the stream because the rate of discount steadily increases. The relationship between the two thus fluctuates either with changes in the amount of capital invested, or with changes in the discount rate.

Another specific weakness of the I.R.R. is that where the firm must choose between two projects both costing the same, it might be the case that the I.R.R. is identical for each even though the returns in individual years are not similar. However, N.P.V. would not be the same for both projects, and would therefore be more meaningful.

Moreover, in the above example, the I.R.R. indicates that a 20% yield on £130 outlay is preferable to a 15% yield on £286 outlay. This is not a logical conclusion to draw where the firm has available the funds to invest in either project since it will then have to decide what to do with the £156 left unused as aresult of choosing project "B". The investment of the £156 would itself

yield an I.R.R. in addition to that yielded by the original £130. If the £156 could be invested at, say 10%, the question would then arise whether or not the firm would prefer one investment of £286 yielding 15% or a combination of two investments, one of £130 yielding 20%, and one of £156 yielding 10%. The optimum alternative may not be obvious. But the difficulty can be solved by employing the incremental yield which is the rate of return on the incremental capital invested in project "A" not invested in project "B".

Incremental Yield

Surplus Outlay	Cash Flows				N.P.V. @ 10%	I.R.R.
£156	50	50	50	50	+£2	11%

The incremental yield is 11%. Had the firm chosen project "B" and invested the incremental capital it would have produced a yield of only 10%. Thus, the firm is better off with the choice of "A". This incremental yield is important since it brings the I.R.R. into line with the N.P.V. regarding the choice of project "A". The difference between the incremental I.R.R. of the larger project and the incremental yield resulting from choosing the smaller project and investing the difference elsewhere, gives the firm an indication of how much better one alternative is than the other.

Thus, firms fearing the unreliability of D.C.F. generally, may be reassured that modifications to the methods in question can eliminate much of the uncertainty.

However, the I.R.R. does possess other drawbacks to take into account. For example, the following investment solves with an I.R.R. of 11%, but the total returns are actually less than the outlay, in which cæe the I.R.R.

is invalid. Of course, the N.P.V. could be used if necessary, to confirm that the project is not worthwhile.

Invalid Internal Rate of Return

Outlay	Cash Flows										I.R.R.
100	45	45	45	45	45	45	45	45	45	-650	11%

But perhaps the most serious problem with the I.R.R. is the question of multiple roots. Consider a simple three phase cash flow. The equation for the I.R.R. is:

$$\frac{A1}{(1+r)} + \frac{A2}{(1+r)^2} - Co = 0$$

By cross multiplying, the equation becomes

$$A1\ (1+r) + A2 - Co\ (1+r)^2 = 0$$

or

$$-Co\ (1+r)^2 + A1\ (1+r) + A2 = 0$$ which is a quadratic.

These equations have two roots (which could, of course, be identical, in which case there is only one solution). A four phase example would produce a cubic equation with three roots, and a five phase would possess four roots. The I.R.R. formula is of a type known as a polynomial of degree "n", and has n-1 roots, where "n" equals the number of years. It is possible to find projects which have cash flows that can be discounted to equality with the outlay at, say 15% and 20%, and perhaps at other discount rates also. The question is which is the economically meaningful root? The existence of multiple roots is not new, and was first noted by Lorie and Savage (12).

Fortunately, most of the roots obtained can be disregarded as they are either negative or imaginary. If the equation solves at -46% and 33% then the latter is the meaningful solution since a 33% rate of return is

genuinely being made on the capital employed, unless negative capital is involved. However, it is important to ensure that there is only one positive root. Descartes's change of sign rule states that there will be as many positive roots for 1+r as there are changes in the signs of the cash flow.

Multiple Roots

Project	Outlay	Cash Flows				Number of Positive Roots
"A"	£100	100	50	200	100	1
"B"	£100	100	50	200	-100	2
"C"	£100	100	-50	200	100	3
"D"	£100	100	-50	200	-100	4

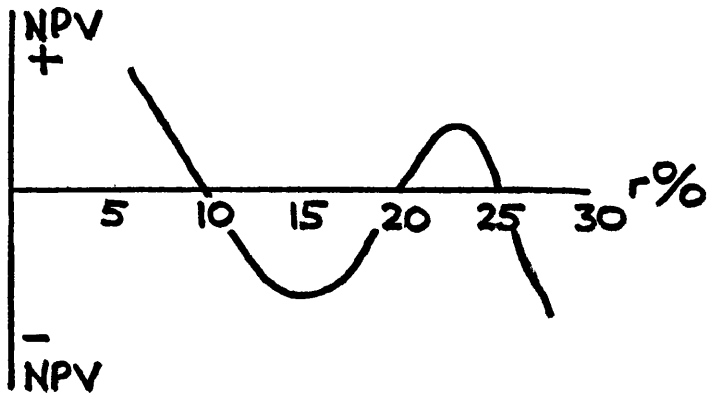
Thus, it can be stated for certain that if, after the initial investment the cash flow is always positive then there would be only one positive root for 1+r and therefore only one for "r" itself. If, however, there are two changes of sign, then there will be two positive values for 1+r and there may be two positive values for "r" itself. But it cannot always be assumed that there will be two positive values for "r" since the two positive values for 1+r may be +0.1 and +1.1 In the first case "r" is actually negative (-0.9 = -90%) and only in the second case is "r" positive (+10%).

To determine all positive values for "r" one needs to discount the stream of cash flows at every rate of discount to discover the N.P.V. at each value of "r". Whenever N.P.V. is zero then the discount rate in question must be a value for I.R.R.

The following figure shows three values for I.R.R. of 10%, 20%, and 25%. If the cost of capital were, say

15%, then the project would not be acceptable because at that rate of discount N.P.V. is negative. The project will only be profitable where the cost of capital is between 0% and 10% or between 20% and 25%.

Multiple Roots
(The Internal Rate of Return)

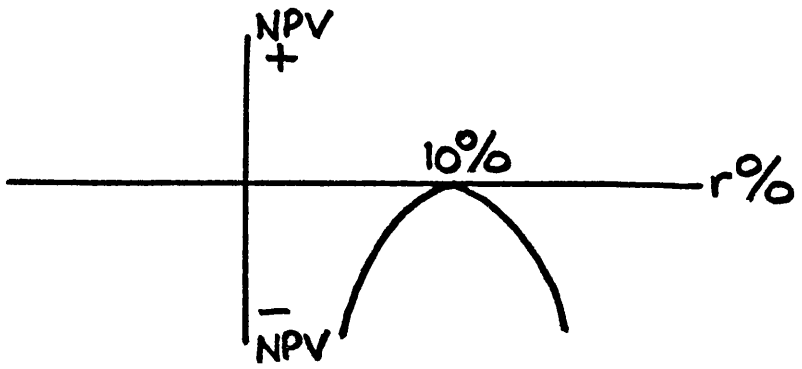


Hawkins and Pearce (13) suggest a simple test to identify multiple roots or discount rates. First find a solution rate for "r". Then add up the discounted value of cash flows year by year. If at any point this value is greater than the initial investment then negative capital exists at that solution rate of return. Once negative capital has been found it is then known that the simple I.R.R. method is invalid since one of two things must be true: (i) either there will be multiple discount rates, or (ii) there will be a unique but economically meaningless value for "r".

It is possible for two other situations to occur. Firstly, I.R.R. may have no value at all in that the

N.P.V. is never zero, meaning that the curve of N.P.V. plotted against "r" would never cut the horizontal axis. Secondly, there may be a unique solution where N.P.V. appears as a curve which lies below the horizontal axix at all points except one, where it is a tangent to the horizontal axis.

Meaningless I.R.R.



The 10% is a unique value for I.R.R. at the point of tangency, but this would only imply that the firm was exactly covering its costs. At all other discount rates the firm would be making losses because the N.P.V. is negative.

The negative capital problem can be solved by the application of the extended yield method. The basis of the technique is that negative cash flows are discounted back at the firm's cost of capital (not the solution rate of return) until they are offset by positive cash flows. The following shows how the negative capital problem can be approached and an acceptable solution obtained.

Negative Capital Solution

Years	0	1	2	3	4	I.R.R.
Cash Flow	-200	100	100	173.3	-110	20%
Adjusted Cash Flow	-200	100	100	73.3	0	18%

Assuming that the cost of capital is 10%, then the -110 can be discounted back from year 4 to year 3, which is then absorbed by the +173.3 The I.R.R. is now in such a form that it has no multiple roots problem.

Clearly, the case for discounting over the use of traditional methods emerges strong. Properly applied, either N.P.V. or I.R.R. can be safely used in most situations. Choosing the relevant discount rate for N.P.V. is a complex and as yet not fully resolved problem, but there is general agreement that some form of weighted average cost of capital at the margin could be used, despite serious problems of measurement. Risk is another area in which no simple clear cut answer can be offered, but certain advances in decision theory have provided some acceptable operational rules for use in industry for dealing with the separate problem of uncertainty.

R. M. Adelson (14) has suggested that it is possible to abandon D.C.F. altogether. He suggests building a model of the firm and its environment and looking to a horizon some years ahead. Projects for appraisal are inserted into the model as they become available, and the effect of particular projects or groups of projects, on various measures of the company's well being at this horizon can be investigated. From the Plymouth Survey experience, such a subjective approach would doubtless be regarded as extremely complex by most firms, and therefore disregarded. Indeed, many of the Plymouth firms considered existing discounting techniques too complicated for their purposes, a finding supported by Klammer (15).

Hopefully, small firms will make themselves more aware of the real drawbacks of the methods they do employ, although, of course, this could reasonably be extended to those firms actually using D.C.F. In the main, however, D.C.F. is respectable. A mere 17% of the Plymouth Survey firms used the technique, and no firm, as already pointed out, was really familiar with aspects of the foregoing D.C.F. review (in itself incomplete) of the problems and the possible solutions. Almost certainly, levels of investment and investment returns were inconsistent with the goal of optimality as a result.

SELECTION OF THE INVESTMENT APPRAISAL METHOD

Firms which did actually use some method of investment appraisal were not always clear how, or why, the technique had been selected, or adopted, in the first place. Practically no firm could claim to have been influenced by the literature on the subject, including H.M.S.O. publications (16) widely available at nominal cost. A notable defence of this position was the "necessity criterion" where on occasions the rate of return was only one factor among many - in the Cyert and March tradition (17) - to motivate investment decisions. But the conclusion that this actually removed the need for advanced D.C.F. calculations, or even forecasts, was of more doubtful substance.

The Plymouth Survey firms were asked to recall how the method of appraisal, and the way in which cash flows were assessed, had been first introduced, or amended from time to time. Table 5.8 is important in the sense that a communications problem would appear to exist between small firms and the emergence of new invest-

ment appraisal techniques.

Table 5.8 Selection of Investment Appraisal Method Plymouth Survey

Method Selected, Introduced, or influenced by:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Tradition, History, Adequacy, etc.	14 (54%)	14 (78%)	8 (67%)	2 (22%)	38 (59%)
Parent Co.	2 (8%)	1 (5%)	2 (17%)	3 (33%)	8 (12%)
New Staff			1 (8%)	1 (11%)	2 (3%)
Literature				1 (11%)	1 (1%)
Auditors				1 (11%)	1 (1%)
Necessity Criterion, e.g. standard payback, or target required	3 (11%)		1 (8%)	1 (11%)	5 (8%)
No formal method adopted	7 (27%)	3 (17%)			10 (15%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires, Question 65

Nearly 60% of the sample explained that their investments had been appraised over the years by means of methods shrouded in tradition. Some of these firms stressed that whatever the drawbacks from employing obsolete techniques, nevertheless, these had proved adequate for the firm in question. But it was noticeable that this rather inflexible approach receded in the larger business units

Possible reasons for this were that introduction of modern methods by parent companies, new staff, and auditors. Smaller firms did seem to be more resistant to these kinds of influence, and it must be borne in mind that 27% of the 0-24 employee group, and 17% of the 25-99 group, i.e. 15% of the total population, did not employ a formal investment appraisal method at all.

ASSESSMENT OF CASH FLOWS

A further development of this line of enquiry concerned the assessment of cash flows at the appraisal stage. How were these estimates produced? How reliable were they? Table 5.9 gives a general picture of the responses.

Table 5.9 Assessment of Cash Flows. Plymouth Survey

Cash flow derived from:-	Employee Groups 0-24	25-99	100-199	200+	Totals
Estimated miscellaneous savings, e.g. from increased sales	10 (38%)	13 (72%)	8 (67%)	5 (55%)	36 (55%)
Labour hours saved	4 (15%)			1 (11%)	5 (8%)
Machine running time saved, e.g. production speed up		1 (5%)	3 (25%)	1 (11%)	5 (8%)
Historical data	2 (8%)	1 (5%)		1 (11%)	4 (6%)
Necessity criterion	3 (11%)		1 (8%)	1 (11%)	5 (8%)

Table 5.9 (Continued)

Cash flow derived from:-	Employee Groups 0-24	25-99	100-199	200+	Totals
No formal method employed	7 (27%)	3 (17%)			10 (15%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires, Question 64.

Well over 50% pointed out that the estimated net returns were based upon a loosely defined miscellaneous savings criterion, e.g. estimated increased profit, improved turnover, convenience of operation, etc. And although results were by no means conclusive, there was a suspicion that it was the very small firms who paid the most attention to labour saving, whilst the larger units were relatively more concerned about reduction in machine running times. A minority used historical data, and optimistically assumed this to be adequate for current appraisal purposes. And, again, the table is completed with the 15% without formal methods.

REVISION OF INVESTMENT APPRAISAL METHODS

Largely as a consequence of the foregoing, attention was then focussed upon flexibility, a characteristic normally associated with the smaller firm. Had investment appraisal methods been subject to periodic revision, or improvement? Table 5.10 shows that nearly 60% of the sample using traditional methods admitted to no major amendments, and this response was fairly evenly spread among all four sizes of firm.

Table 5.10 Revision or Upgrading of Investment Appraisal Methods. Plymouth Survey

Degree of amendment	Employee Groups 0-24	25-99	100-199	200+	Totals
No revision of use of traditional methods	16 (61%)	11 (61%)	6 (50%)	5 (55%)	38 (59%)
No upgrading or revision of use of modern I.A. methods	1 (4%)	2 (12%)	4 (33%)	4 (44%)	11 (17%)
Recent tentative usage of D.C.F. e.g. checking	2 (8%)	1 (5%)			3 (5%)
Revision of traditional method under consideration		1 (5%)	2 (17%)		3 (5%)
No I.A. method used	7 (27%)	3 (17%)			10 (15%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 69

But of the 17% employing modern techniques, paradoxically, the larger units appeared to be the ones more prone to inflexibility. However, the change from a traditional method to a modern one was of far greater significance than a change from a basic D.C.F. approach to a rather more sophisticated calculation. Although all of the 200+ employee group recorded no revision of method, it must be noted that 44% of these were already using D.C.F. And,

indeed, if D.C.F. was under consideration for usage, it tended to be in the larger firms. In general terms then, the very small firms did not present an encouraging picture in respect of the selection of the investment appraisal method; the assessment of the cash flows; and flexibility of approach, and the whole question of the use of other management techniques arose. If small firms were not advanced in the use of modern D.C.F., did they compensate for this by the application of operations research in other areas? Unfortunately, this aspect could not be pursued in depth, but some data were collected.

APPLICATION OF MANAGEMENT TECHNIQUES

Respondents were asked to indicate the most important operations research techniques employed including investment appraisal. Table 5.11, however, specifically restricts the choice to the one management technique considered to be indispensible for the firm's efficient operation. Even allowing for the fact that the nature of the industry and the type of production undertaken could influence this, it is striking in Table 5.11 that investment appraisal is not accorded this priority by any of the firms.

Table 5.11 Most Prominent Management Techniques Employed. Plymouth Survey

Technique	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Quality Control			1 (8%)	1 (11%)	2 (3%)
Budgeting, Costing, etc.	11 (42%)	6 (33%)	5 (42%)	3 (33%)	25 (38%)

Table 5.11 (Continued)

Technique	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Stock Control	2 (8%)	2 (12%)	1 (8%)	1 (11%)	6 (9%)
Market Research & Forecasting	2 (8%)	2 (12%)		1 (11%)	5 (8%)
Production Scheduling/ Control	8 (31%)	2 (12%)	3 (25%)	3 (33%)	16 (25%)
Work Study/ Measurement		2 (12%)	1 (8%)		3 (5%)
Investment Appraisal	-	-	-	-	-
NO prominent technique employed except for miscellaneous administration.	3 (11%)	4 (22%)	1 (8%)		8 (12%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaire; Question 70

Budgeting in its widest sense, and production scheduling appeared to be the most popular techniques used. A slightly disturbing statistic was that 12% of the firms could not indicate a major operations research method at all, but this applied mainly to the smaller firms.

By wa of comparison, in 1970 the Engineering Training Board employed the Bristol Polytechnic Small Business Centre to survey a sample of engineering companies employing up to 200 people in four regions in England. The following table from the report summarises the use of 14 selected management techniques by the 79 companies interviewed.

Table 5.12 Management Techniques used by Small Firms in the U.K.

Technique	London Area	Midlands Area	Yorkshire and Humberside area	South West Area	Totals
Budgetary Control	15 (75%)	12 (60%)	13 (65%)	15 (75%)	55 (70%)
Job Description	12 (60%)	11 (55%)	11 (55%)	13 (65%)	47 (60%)
Method Study	10 (50%)	8 (40%)	8 (40%)	10 (50%)	36 (46%)
Cost Centres	7 (35%)	10 (50%)	13 (65%)	7 (35%)	37 (47%)
Quality Control	15 (75%)	12 (60%)	12 (60%)	15 (75%)	54 (68%)
Production Scheduling	19 (95%)	20 (100%)	14 (70%)	13 (65%)	66 (84%)
Manpower Planning	12 (60%)	7 (35%)	7 (35%)	13 (65%)	39 (49%)
Value Analysis	7 (35%)	3 (15%)	5 (25%)	7 (35%)	22 (28%)
Marginal Costing	9 (45%)	10 (50%)	7 (35%)	3 (15%)	29 (37%)
Work Measurement	12 (60%)	8 (40%)	9 (45%)	10 (50%)	39 (49%)
Critical Path Analysis	3 (15%)	4 (20%)	2 (10%)	5 (25%)	14 (18%)
Performance Appraisal	7 (35%)	6 (30%)	6 (30%)	10 (50%)	29 (37%)
Stock Control	18 (90%)	16 (80%)	15 (75%)	15 (75%)	64 (81%)
Productivity Bargaining	7 (35%)	5 (25%)	7 (35%)	4 (20%)	23 (29%)
Totals:-	153 (55%)	132 (47%)	129 (46%)	140 (53%)	554 (50%)

Source: Bristol Branch Discussion Paper No. 1. British Institute of Management, "The Needs of the Manager in the Small Company", June 1972, p A7.

The 50% usage of management techniques by the firms in the B.I.M. Survey was surprisingly low in view of the 88%, i.e. 100% - 12%, recorded in the Plymouth Survey, especially as all the B.I.M. firms were in engineering where greater rigour of application was probably more essential than for firms in other industries, e.g. Pottery. However, in the Plymouth study the interviewees were "pressed" for their priorities and the 88% result could well be overstated here. For example, a firm professing to employ budgetary control might not necessarily have been expert or even rigorous in its application. Nevertheless, some correlation between the B.I.M. and Plymouth Surveys cannot be ruled out. If the rankings of priorities in the two studies are compared, there is an element of agreement.

Table 5.13 Comparison of Rankings of Operations Research Methods used by Firms in the B.I.M. and Plymouth Surveys

Technique (NB) Spearman Rank Correlation = 0.53	B.I.M. Survey Rankings as per Complete list, i.e. Multiple Choices.	Plymouth Survey Rankings i.e. Priority Choices only
Quality Control	68% (4)	3% (7)
Budgetary Control	70% (3)	38% (1)
Stock Control	81% (2)	9% (4)
Forecasting	not included	8% (5)
Prod'n Scheduling	84% (1)	25% (2)
Work Study	49% (6)	5% (6)
Invest. Appraisal	not included	0% (-)
No Techniques	50% (5)	12% (3)

Source: Bristol Branch Discussion Paper No. 1, British Inst. of Management, "The Needs of the Manager in the Small Co", June 1972, p A7, and Plymouth Survey Questionnaires, Question 70.

This agreement may, or may not, be significant. Further research is obviously required in this area. For example, if one considers the extent of market research and demand forecasting carried out by the Plymouth firms, one finds a minimum of application, i.e. 8%. It is true that some companies felt that market research and forecasting were impracticable in their spheres, but even so, this could not excuse the absence of basic demand estimating. Indeed, although other firms believed that market research and forecasting were possible, these activities still tended to be somewhat neglected.

But returning to Table 5.13, even if agreement among the rankings is acknowledged, it is of less importance than the overall objective of probing for the most vital management technique. Since no firm listed investment appraisal, it would tend to confirm growing impressions of non-optimal investment behaviour by the sample, and the following paraphrased extracts covering the selection of the investment appraisal method, cash flow assessment, flexibility, and the use of management techniques add weight to this proposition.

RIGOUR OF MANAGEMENT TECHNIQUES EMPLOYED

"The investment appraisal method, i.e. payback, is of traditional origin, and the N.P.V. or I.R.R. have never been used. If the investment is vital, e.g. to conform with food legislation, then advanced techniques are irrelevant. Cash flows, however, are usually assessed on a formal wages saving basis. The firm has never revised its methods in favour of modern practices, although the payback has been modified on occasions to suit the nature of the investment. Few management techniques are employed except for basic food quality control, stock records, internal audit, etc". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food Source Plymouth Survey Questionnaires, Questions 64, 65, 69, and 70).

"Although always aware of D.C.F. it was left to head office to introduce it recently. Cash flows had been assessed on an historical basis, but currently we are using a specific saving approach. These revisions of methods were probably long overdue. Other management techniques are also being developed, e.g. budgeting, stock control, etc., but on a modest scale". (P2; 95; D; FDT; Brewing; PSQ,Q64, 65, 69 and 70).

"We have had no real investment problems in the past and thus the need for advanced techniques has not arisen, and even cash flows are estimated in an informal way, e.g. reduced costs from smaller labour force, increased profit by quicker delivery service if investing in vehicles, etc. Not surprisingly, no major revision of investment appraisal method has been considered necessary. No continual investment is undertaken, and the method to some extent is an irrelevance. Some administrative techniques are used such as budgets, forecasts, etc., but no market research is pursued". (P3; 50; C; FDT; Confectionery; PSQ,Q64, 65, 69 and 70).

"Payback has always been employed, even since the take-over. But we are expecting a 'current purchase accounting system' to be introduced and this could change our payback approach. Cash flows are estimates only and the assumption that the food market is usually stable forms the basis of the assessments which tend to be non-mathematical. Revision of the investment appraisal method has not formally occurred and the 5 year payback period has been standard practice. However, we have been considering the cash flows beyond the payback period more, and currently looking to the newer trends, although doubts about validity remain. Several management techniques are in operation here, but the one technique which could be helpful, i.e. work study, has not been seriously considered". (P4; 600; D; FDT; Baby Food; PSQ,Q64, 65, 69 and 70).

"The procedure for investment appraisal here is not strictly a method at all. A non-mathematical approach is adopted in conjunction with the 'necessity criterion'. Cash flows, similarly, are not assessed in a formal manner. Methods have not been revised and we tend not to be influenced by the literature. No major operations research is employed beyond the usual administrative and production systems". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q64, 65, 69 and 70).

"The I.R.R. has been introduced by new staff, auditors, etc., experienced in this, and related methods; the result of actively seeking techniques to counteract the difficulties of investing in the meat trade. But the majority of cash flows tend to be automatic by virtue of investment necessity. Although the I.R.R. is now used, the payback still operates as a basis for decision. As far as operations research is concerned, fluctuating demand prevents the usual techniques from being applied, e.g. the plant is rarely at full capacity, and production control is rendered difficult". (P6; 450; D; FDT; Meat; PSQ,Q64, 65, 69 and 70).

"No formal method of investment appraisal is employed beyond the application of know-how, common sense, own judgement, etc. No revision of methods has, thus, been considered. No management techniques are used except for the normal adminstrative and production systems. And no forecasting or market research is undertaken". (P7; 20; C; FDT; Minerals; PSQ,Q64, 65, 69 and 70).

"Our use of payback is traditional and cash flows are not calculated by advanced mathematics. This approach has never been revised since we believe that a positive investment policy is always more important than the actual method employed. Additionally, no high geared management techniques are adopted over and above the usual office and works records". (P8; 300; C; FDT; Bread; PSQ, Q64, 65, 69 and 70).

"The simple payback has been the local method used, but the parent company could influence the adoption of D.C.F. in time. In any event, cash flows are still estimated rather than calculated. Methods are not revised as a continuing policy, but they would be in the face of a crisis. It could be the case that D.C.F. is irrelevant to small firms anyway. No major operations research techniques are employed". (P9; 15; D; CAI; Fertiliser; PSQ, Q64, 65, 69 and 70).

"Capital expenditure viablity has traditionally been assessed on a rate of return basis, whilst cash flows are estimated from historical records as most machines tend to be similar on replacement. The smallness of the unit here has reduced the need to revise the investment appraisal method, or indeed, to apply advanced management techniques". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q64, 65, 69 and 70).

"Since we have always believed in the break-even

principle, the payback has been the natural method of appraisal, with estimated net returns being derived from the savings of new equipment over the old. The system, however, has recently been revised in favour of D.C.F., although the mathematical problems of N.P.V. and I.R.R. are unknown. Generally, advanced management techniques are not employed". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q64, 65, 69 and 70).

"Our investment appraisal method has evolved from the need to develop longer production runs for increased output, and cash flows are also geared to this factor. There has been no reason to amend the technique or to introduce sophisticated management systems". (P12; 8; C; MME; Injection Moulds; PSQ,Q64, 65, 69 and 70).

"The adoption of the N.P.V. has been a recent innovation from our financial director, although familiarity with related methods is limited, e.g. I.R.R. All investment is assumed to pay and thus accurate calculations of cash flows are not necessarily vital. Estimates tend to be based upon the historical data of previous capital items. Certain management techniques have been introduced, but no specific work has been carried out on investment appraisal to actually improve the current method. Awareness of the literature could possibly have been helpful in this respect. Research and development are management techniques which are negligible here". (P13; 170; B; Steelwork; PSQ,Q64, 65, 69 and 70).

"The payback has always been the method used but recently D.C.F. has been introduced by the parent company. In either case, cash flows are calculated on a machine saving basis, i.e. time saved @ rate/hour adjusted for tax and depreciation. But risk factors are excluded. However, sophisticated mathematics are not involved either in the investment appraisal itself, or in the miscellaneous management techniques employed, e.g. budgeting, production control, statistics, etc". (P14; 468; B; MME; Machine Tools; PSQ,Q64, 65, 69 and 70).

"Only the payback has ever been used and this, together with the cash flows has been operated in an informal way involving degrees of guesswork. The method has never been revised although the payback standard has been varied on occasions. No advanced management techniques are employed and this could have affected profit over the years". (P15; 14; B; MME; Industrial Signs; PSQ,Q64, 65, 69 and 70).

"Investment appraisal is based entirely on our own private philosophy of only paying cash for what is urgently required. Thus, under such conditions, all investment is presumed to pay for itself. Cash flows need not be estimated and no specific investment appraisal technique is really needed. This approach has never been revised, or is likely to be changed in the near future. No management techniques are employed beyond the basic systems. In fact, the firm operates on the owner's exclusive use of memory, and on the view that 80% of all techniques are probably inapplicable to small firms anyway". (P16; 10; C; MME; Press Tools; PSQ,Q64, 65, 69 and 70).

"Capital spending has usually followed the pattern of selecting the item required and knowing that it will pay, especially if urgently needed, e.g. to complete a contract. No formal estimating of cash flows is undertaken; basic experience of net returns is sufficient. The method has not been revised, but there has been some introduction of management techniques, e.g. work study. However, no rigorous mathematics are employed, nor are they considered necessary". (P17; 90; C; MME; Packaging Machinery; PSQ,Q64, 65, 69 and 70).

"No investment appraisal method is used. There is no need for rigorous techniques as such. If we invest at all, e.g. tools, then the objective would be in the labour saving area. Cash flows at the investment appraisal stage are not calculated beyond knowing that each boat takes 2500 hours to complete, etc., but monthly income is monitored, i.e. after any investment has actually taken place. No revision of this system has occurred, and none is really required since investment here is at a minimum and is likely to remain so. Negligible operations research is employed but a management technique which could be useful, i.e. critical path analysis, is unfortunately, not practised". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q64, 65, 69 and 70).

"The payback method has always been operated and is likely to remain since knowledge of D.C.F. is limited. All prospective cash flows are derived from historical data from previous machines' performances. The investment appraisal method cannot determine the worthwhileness of projects and thus, no revision of the above technique which has worked well to date, would appear to be necessary. Any management technique employed tends to be on the general finance side, but these are not at an advanced a level as they might be in a large firm". (P19; 60; B; MME; Boats; PSQ,Q64, 65, 69 and 70).

"The tendency here has always been to work on a 5 year basis and this represents the payback standard. Some suspicion surrounds investment appraisal generally, as judgements do not necessarily emerge from mere figures. Cash flows, however, are determined by the estimated increase in turnover from the new equipment giving a 9% net profit. This method has not been revised, and investment appraisal literature is not likely to influence this. Although techniques can mislead, certain management aids are in operation, but none of the major ones are practised, e.g. budgets are prepared, but we have no value engineering". (P20; 120; B; MME; Luxury Yachts; PSQ,Q64, 65, 69 and 70).

"Traditional usage of payback has served its purpose for this small firm and no revision of method has been considered necessary. Few mathematical techniques are employed and some capital items are not assessed at all". (P22; 21; B; MME; Boats; PSQ,Q64, 65, 69 and 70).

"No advanced investment appraisal calculations or major operations research techniques are adopted here. Small firms have little need of these". (P23; 50; B; MME; Iron Castings; PSQ,Q64, 65, 69 and 70).

"Payback has been the traditional method used along with the parent company, and it appears to have been adequate. Cash flows are estimated by a simple calculation of the general contribution to overall profitability. This system has not been subject to revision nor is there any likelihood of change in the foreseeable future. No prominent mathematical techniques are practised beyond those necessary for basic production and administration". (P24; 200; C; MME; Toolmaking; PSQ,Q64, 65, 69 and 70).

"Traditionally, we have chosen the simplest method of investment appraisal, i.e. payback, together with estimating the likely growth of the paper industry and investing accordingly. A non-mathematical approach is adopted, e.g. for cash flows, and no revision of this policy is imminent. The literature, outside expertise, etc., has been of little influence in respect of investment appraisal, and other management techniques, the introduction of which can be over-rated in the small firm". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q64, 65, 69 and 70).

"Our investment appraisal technique (payback) was not really selected, it emerged as a likely method over the years from the assumption that rapidity of payback

was a good business rule. Cash flows are not calculated formally, but occasionally the likely net returns have been suggested by suppliers. This method has not been amended in any way since it is questionable whether advanced investment appraisal methods contribute anything to the optimum investment decision. Few management techniques are employed, e.g. forecasting is impossible, and market research is too costly". (P26; 70; A; MME; Trawler Repairs; PSQ,Q64, 65, 69 and 70).

"A new firm requires a cautious approach and the payback or rate of return stresses the importance of outlay recovery. However, no mathematical devices are employed. We have no plans to revise this policy, and the literature, or outside advice, have not been consulted. A little production scheduling is in operation but apart from the usual budgeting, etc., no advanced management techniques are practised". (P28; 4; B; MME; Aluminium Castings; PSQ,Q64, 65, 69 and 70).

"Payback had always been used until the recent introduction of D.C.F. by the parent company in order to attain standardisation of systems especially where heavy spending was involved. Cash flows are based upon the criterion of comparing the saving produced by the new equipment over the old. Miscellaneous management techniques are in operation, e.g. financial and production, but forecasting and market research both tend to be unreliable". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q64, 65, 69 and 70).

"Historically, investment has been considered from a payback point of view with cash flows containing elements of trial and error; a system which appears to have been adequate for this three man firm. No modification of this rule of thumb has been undertaken, and we are not familiar with the literature on the subject. Very few management techniques are applicable to skilled one-off work in the very small firm, and some would be far too costly to implement, e.g. value engineering". (P33; 3; A; MME; Luxury Yachts; PSQ,Q64, 65, 69 and 70).

"The payback is the obvious investment appraisal method for small firms where rapid returns are required. Since costs of production are also watched carefully, cash flows are related to the level of cost reduction generated from the new equipment. However, it is not as a rule possible to project beyond five years. We are always looking at our administrative systems with the view to improvement, but very little has been done to

upgrade the investment appraisal method. The electrical engineering industry is very much in the hands of the market, and advanced management techniques would appear to be difficult to implement, e.g. forecasting is almost impossible". (P38; 8; B; EE; Control Panels; PSQ,Q64, 65, 69 and 70).

"Our method of investment appraisal was not selected as such; the payback has always been in operation. Recovery of outlay as soon as possible is a sound business practice under any conditions as one cannot afford to borrow short term simply to repay overdue loans secured for the capital item purchased. Although a cash flow series is always prepared, returns after the payback point tend to be disregarded. No doubt head quarters are aware of D.C.F. but it has never been imposed here at branch level. Many of the so-called management techniques are not always applicable especially if demand is unpredictable or subject to crises, e.g. foreign imports of footwear". (P39; 800; D; TLCF; Footwear; PSQ,Q64, 65, 69 and 70).

"The investment appraisal method, i.e. payback, has not been influenced by the literature, outside advice, etc., and we have no plans to change it. Our work study team calculates the cash flows based upon the savings from the new machinery. In fact, work study is probably our most important management technique in this labour intensive industry". (P40; 158; B; TLCF; Clothing; PSQ,Q64, 65, 69 and 70).

"We use N.P.V. but are unsure as to how the method originated here. Cash flows, though, have always been calculated from a production speed-up angle, e.g. net saving from the replacement equipment. No revision or improvement in this system has taken place in the recent past. Basic work study is our most prominent management technique but critical path analysis which could be useful, has never been developed". (P41; 150; C; TLCF; Clothing; PSQ,Q64, 65, 69 and 70).

"The normal accounting ratio technique of expressing profit as a rate of return on capital and comparing this with the target has been our traditional method. The profit is estimated on a reduced hours basis and labour saving devices are always being sought. This approach has not been subject to very much revision, updating, etc., since we believe that the quality of the investment decision is not necessarily related to the quality of the investment appraisal method. A few man-

agement techniques are in operation, e.g. stock control, work flows, etc., but forecasting and market research are not strongly represented". (P43; 13; C; TLCF; Wet Suits; PSQ,Q64, 65, 69 and 70).

"The informal operation of the payback method has appeared to be an adequate approach for this firm with its limited capital requirements. (Yet growth policy allegedly pursued). Cash flows are not calculated as such; they would be presumed to be acceptable in proportion to the importance of the item in question. There are no plans to convert this method into a D.C.F. based system". (P44; 45; D; BPG; Glass; PSQ,Q64, 65, 69 and 70).

"The speed of outlay recovery; unit cost reduction; labour saving; etc., are all relevant features of sound investment spending. But no advanced calculations are undertaken when projects are considered. Basic know-how plus some trial and error suffice. D.C.F. has never been seriously considered, and many of the other management techniques are inappropriate apart from normal finance and production monitoring". (P46; 140; C; BPG; Pottery; PSQ,Q64, 65, 69 and 70).

"Payback was adopted by necessity, i.e. the break even point was always a crucial issue. But formal calculations, e.g. cash flows, are not necessarily important if the project itself is top priority, or the level of investment activity is normally low. The usual management systems are operated with forecasting based upon historical data rather than market research". (P47; 13; B; BPG; Pottery; PSQ,Q64, 65, 69 and 70).

"Vertical investment has been minimal here and the method of investment appraisal together with the calculation of the cash flows have not been accorded any real priority. Improved economic conditions could influence this approach rather more than the literature on the subject". (P49; 19; B; OMG; Blinds; PSQ,Q64, 65, 69 and 70).

"No set investment appraisal method is used here, nor are cash flows calculated apart from intuitive assessments as to whether or not an item will actually pay its way. D.C.F. is unfamiliar, and other management techniques are minimal". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q64, 65, 69 and 70).

"The set-up of the firm and the way production is

organised to meet demand are responsible for the choice of the investment appraisal method, i.e. payback. We have no funds for positive vertical investment and any horizontal spending must be recovered quickly. Cash flows are also assessed variably depending on what is to be improved, e.g. if the project is production orientated then the flows would be based upon, say, labour saving; if conditions are to be improved, then flows would not be calculated too rigorously. No revision of this system would appear to be necessary, except that a large major investment would probably be appraised professionally. Very few management techniques are employed, but although there is no forecasting here, we are willing to indulge in some market research if not too expensive". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q64, 65, 69 and 70).

"No investment appraisal method is adopted and all capital spending is based upon instinct and necessity. However, major items would be assessed for their savings value, e.g. the new floor saved our having to hire space. This system has never been changed, and in any event, would revision make the decisions any easier? Investment is still a question of go-ahead or not. In a similar way, management techniques generally would have limited applicability here". (P54; 24; B; OMG; Printing; PSQ,Q64, 65, 69 and 70).

"A non-formal approach to investment has always been the policy and it seems to have been sufficient. Probably 80% of all management techniques are not relevant in small firms, although critical patch analysis could possibly be applied here". (P55; 25; A; OMG; Vehicles; PSQ,Q64, 65, 69 and 70).

"D.C.F. has been recently introduced although the payback remains. Cash flows by any method are still based upon a good deal of guesswork. Some management techniques are used but not to an advanced level". (P60; 106; C; OMG; Building Materials; PSQ,Q64, 65, 69 and 70).

"D.C.F. was introduced by the U.S.A. base company. We were not really aware of the technique prior to this, and even now we are not convinced that the method contributes significantly to successful investment. Cash flows, however, are derived from the advantage from savings of labour and materials with depreciation and taxation adjustments included. Continuous revision of methods has not been the policy in the past although this approach could be modified in future. Management tech-

niques are employed appropriate to the size and nature of the plant, but no high level mathematics are involved". (P62; 400; C; OMG; Business Systems; PSQ,Q64, 65, 69 and 70).

"Payback has been in operation here for at least 30 years. The system has worked and we see no reason to change it. Cash flows are assessed on an historical data basis, e.g. income from previous items purchased. No management techniques are employed and none are needed in this small firm". (P65; 30; B; OMG; Tents; PSQ,Q64, 65, 69 and 70).

In the majority of cases it appeared that the method of investment appraisal used by the firms was not so much "selected" as "emerged". Some of the smaller units repeated that if investment was vital then it would be presumed to pay for itself and thus, an investment appraisal technique would be an irrelevance. Similarly, D.C.F. would not normally be required by very small firms, especially where no investment problems existed, and where basic common sense, quesswork, and even memory would suffice. However, some companies pointed out that their method had been selected as a result of some event, e.g. the need to break even, the knowledge that sales rose by 10% per annum, etc. But hardly any firm could claim the application of sophisticated investment appraisal or advanced mathematics. Interestingly, one firm admitted that the lack of investment technique could have caused reduced profit over the years, and another, although desiring growth, nevertheless, pursued a static investment policy.

Cash flows were estimated on a miscellaneous savings basis, with historical data prominently used. At least one firm mentioned that cash flows on occasions had been suggested by the suppliers of the equipment, whilst other companies placed more emphasis upon the current rather than the expected net returns.

Revisions, up-gradings, and improvements to the investment methods were rather limited and the view that the quality of the investment decision did not necessarily spring from the quality of the investment appraisal method was quite strongly held. Those firms who had turned to D.C.F. were, nevertheless, unaware of the real mathematical pitfalls of the technique. This general lack of flexibility could have resulted in some lost opportunities in that viable investment could have been missed through inadequate investment appraisal.

As far as management techniques were concerned, these fell into two main categories; those which were required for the normal production and financial monitoring, and those of a more advanced variety. The latter were not widely adopted and even basic forecasting, not to mention market research, was of a doubtful standard. A number of firms considered that forecasting was impossible, others believed that market research was far too expensive. But a few companies volunteered that although some management techniques could have been profitably applied they had never been introduced, and no good reason for this was forthcoming. A minority of the sample felt that management techniques in general could mislead decisions. and one managing director claiming the usage of several, did not understand the workings of the techniques named.

From previous extracts quoted in Chapter 3 it might be recalled that some firms felt that investment was occasionally imperative simply to adjust to a new situation, e.g. in order to remain in business. It is therefore, not too surprising to have confirmed in Chapter 5 that firms did not feel the need for advanced techniques under such circumstances. In fact, 59% of the sample claimed that their method had resulted from traditional usage, and in most cases, proved itself suitable for the

nature of the firm and the industry in question.

Additionally, the point made that the rate of return was merely one factor among many which influenced investment could be misleading. Not all firms defined profit in the same way. Thus, if a firm said that investment was undertaken in order to speed up output, e.g. P41, this was really another way of saying that investment was for profit. This is not in dispute. The issue which has been under constant review has been whether firms invested for optimum returns or not. The evidence would suggest, again, that this was unlikely to be the case. Firms were not aiming for, or achieving, the optimum returns attainable via investment appraisal.

FACTORS TAKEN INTO ACCOUNT IN INVESTMENT CALCULATIONS

If it is assumed, and reasonably so, that certain factors, e.g. taxation, depreciation, investment grants, risk, inflation, etc., must be included in the investment appraisal computation for accuracy, then the results from the 85% of the Plymouth firms who did employ a specific method were not encouraging. Interviewees were asked to:

(i) State those factors which were normally included in their calculations.

(ii) Demonstrate how these were, in fact, taken into account.

(iii) Give, if possible, examples of real investment appraisals undertaken by the firm.

Table 5.14 below was prepared from the responses to item (i). If the known 15% not employing a method at all is included, then 42% (15% + 27%) of the sample did not include formally any of the factors reasonably considered necessary for accurate appraisal. Indeed, in the 0-24

employee group the result was 65%. Fortunately, this figure reduced significantly with the increased size of firm.

Table 5.14 Factors Taken into Account in Investment Appraisal Calculations. Plymouth Survey

Factor Included in Calculations:-	Employee Groups 0-24	25-99	100-199	200+	Totals
NO formal method used	7 (27%)	3 (17%)			10 (15%)
NO factors formally included in calculations	10 (38%)	4 (22%)	3 (25%)	1 (11%)	18 (27%)
Depreciation only		1 (5%)			1 (1%)
Dep'n and Taxation	4 (15%)	3 (17%)	1 (8%)	1 (11%)	9 (14%)
Dep'n, Taxation, and investment incentives including tax allowances	5 (19%)	5 (28%)	7 (58%)	4 (44%)	21 (32%)
Dep'n, taxation, investment incentives, tax allowances, plus inflation adjustments		2 (12%)	1 (8%)	2 (33%)	6 (10%)
Expected inflation, risk, uncertainty, obsolescence, etc.	nil	nil	nil	nil	nil
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 66.

The most popular combination of factors taken into account appeared to be depreciation, taxation, and investment incentives including tax allowances. Some 32% of the firms acknowledged these, but, again, the inclusion was rather more pronounced in the larger units.

Surprisingly, only 10% felt the need to make adjustments for inflation, and the majority of these, once more, consisted of the larger companies. In fact, none of the 0-24 group took inflation formally into account. It is true that many firms claimed that inflation was not measurable in the same way, for example, as depreciation and thus, it could not be meaningfully included. But on the other hand, depreciation can be equally arbitrary on occasions. However, if the companies had been more D.C.F. conscious, then one possible solution might have been simply to increase the discount factor by an amount appropriate to the level of inflation. Expected inflation could have been coped with similarly.

But a point of some interest was that no firm felt that such items as risk, uncertainty, and likely obsolescence, etc., could be mathematically catered for. Indeed, a few of the firms who claimed to take inflation into account merely assumed it to be self-correcting by reduced returns being countered by increased prices. It was possible, of course, that some firms did make indirect allowance for risk, uncertainty, and obsolescence, but if they could not produce evidence of this in their examples then these were ignored. Incidentally, risk refers to situations in which the outcome is not certain, but where the probabilities of the alternative outcomes are known, or at least can be estimated. Uncertainty is present where the unknown outcomes cannot even be predicted in probabilistic terms, that is, it refers to contingencies against which one cannot protect oneself on ordinary

insurance principles.

Bearing all these points in mind, 57% of the population made some kind of allowance for: (i) depreciation; (ii) depreciation and taxation; (iii) depreciation, taxation, and investment incentives including tax allowances; or (iv) depreciation, taxation, incentives, allowances, and inflation. A further reference to the Taylor Nelson Survey (8) at this stage is of some relevance. This particular study it will be recalled, covered the pattern of industrial investment in the U.K. and included all sizes of firm. The results were reported in "The Director" of November 1970. Of the 83 companies involved, 44 (53%) took taxation, allowances, etc., into account, whilst 35 (42%) did not. Four firms were recorded as undecided. Moreover, Taylor Nelson found that the companies expecting the higher returns were, in fact, the ones who actually ignored the factors under review, and taxation allowances particularly. We have already observed in Chapters 3 and 4 that if governments were to raise profits directly in small firms in order to increase investment funds, then tax allowances could well be only a marginal influence since they tended to be somewhat obscure, surrounded by bueaucracy, and obtained at too late a date. Taylor Nelson also stressed the questionability of tax allowances.

However, the 53% taking factors into account from Taylor Nelson compared remarkably with the 57% from the Plymouth Survey. One question now remained; how were these factors catered for?

"No factors are formally taken into account but inflation balances out automatically as prices are raised. Food is a safe line and uncertainty is not too significant a problem". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 66 and 67).

"Depreciation is included in the investment appraisal calculation by usage of the average outlay technique. Tax is also considered in that the returns are quoted net after a 50% reduction. Inflation, risk, and other non-measurables are not taken into account specifically owing to their unpredictabilities". (P2; 95; D; FDT; Brewing; PSQ,Q66 and 67).

"The return on outlay is calculated net of depreciation, taxation, and allowances, but inflation, risk, etc., are not included". (P3; 50; C; FDT; Confectionery; PSQ,Q66 and 67).

"Special factors are not considered in a mathematical or formal manner. All calculations tend to be based on historical data, but these can be adjusted by means of price changes and cost reductions". (P4; 600; D; FDT; Baby Food; PSQ,Q66 and 67).

"No formal method of investment appraisal is used but some of the factors tend to be self-correcting, e.g. inflation. Mathematical rigour is not applicable to small firms with minimal investment activities". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q66 and 67).

"Expected returns are quoted net for calculation by I.R.R. Schedules are prepared and discussed. The method, despite the lack of advanced mathematics, seems to be adequate". (P6; 450; D; FDT; Meat; PSQ,Q66 and 67).

"No formal method is adopted and thus no factors are considered, but inflation could be self-balancing". (P7; 20; C; FDT; Minerals; PSQ,Q66 and 67).

"If the outlay is spread over the whole life of the asset then depreciation is obviously considered. For example, a vehicle costing £5000 by straight line method simply averages at £2500. Also, if vehicle resale values are falling but costs are rising then an adjustment would be made for this when the payback point is calculated. But no other factors would be automatically taken into account". (P8; 300; C; FDT; Bread; PSQ,Q66 and 67).

"If the investment is vital then the investment appraisal method, i.e. the rate of return, and the inclusion of speical factors in the calculations, are not important. However, figures would always be quoted net of tax, depreciation, and other measurables". (P9; 15; D; CAI; Fertiliser; PSQ,Q66 and 67).

"Returns are usually net, but the whole operation is guesswork". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q66 and 67).

"Taxation reduces the returns by about 50%; outlays are straight lined; and inflation is automatically covered by price changes". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q66 and 67).

"No factors are formally considered but estimates of savings could be adjusted by trial and error". (P12; 8; C; MME; Injection Moulds; PSQ,Q66 and 67).

"Cash flows are amended to allow for taxation, depreciation, etc., but risk, and uncertainty cannot be calculated". (P13; 170; B; MME; Steelwork; PSQ,Q66 and 67).

"Measurables, e.g. taxation, are included; non-measurables, e.g. risk, are not. Returns are adjusted as per document provided". (P14; 468; B; MME; Machine Tools; PSQ,Q66 and 67).

"Factors are not taken into account formally. Inflation can be ignored and there is little risk involved. Also, if investment is crucial then most calculations can be disregarded". (P15; 14; B; MME; Industrial Signs; PSQ, Q66 and 67).

"No formal calculations are undertaken. All investment is paid for in cash". (P16; 10; C; MME; Press Tools; PSQ,Q66 and 67).

"The inclusion of special factors is minimal here and especially where the investment need over-rides all calculations". (P17; 90; C; MME; Packaging Machinery; PSQ,Q66 and 67).

"No major investments have been undertaken; there has been no need for formal investment appraisal; and thus, no inclusion of special factors in the calculations has been required". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q66 and 67).

"Although new premises had to be obtained almost irrespective of the rate of return, taxation, depreciation, government grants, and all other measurables were taken into account to produce the required 9% net profit. Inflation, risk, etc., were excluded". (P20; 120; B; MME; Luxury Boats; PSQ,Q66 and 67).

"Any factor which affected the time saved from an investment would always be part of the calculations. But such items as risk, obsolescence, etc., would not be easy to include". (P22; 21; B; MME; Boats; PSQ,Q66 and 67).

"Cash flows are suitably amended for tax and depreciation but no formula is applied for risk or inflation". (P23; 50; B; MME; Iron Castings; PSQ,Q66 and 67).

"Taxation and depreciation are normal inclusions but inflation tends to be self-correcting by price increases. Estimated cash flows are adjusted but this is not always a vital operation, e.g. if the capital item is urgently required to complete a contract". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q66 and 67).

"Only measurable factors are included in the investment appraisal calculation". (P27; 40; D; MME; Thermowells; PSQ,Q66 and 67).

"Inflation is taken into account simply by investing in capital equipment which hopefully will reduce cost of production. Beyond this sort of approach, no other factors would be considered, especially as all investment here tends to be vital and is installed irrespective of the rate of return". (P28; 4; B; MME; Aluminium Castings; PSQ,Q66 and 67).

"Investment grants have been taken into account but the application of tax allowances is obscure. Risk, uncertainty, and inflation, are difficult items of measurement to include in the payback calculations". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q66 and 67).

"Measurable factors are specially included whilst inflation, for example, is automatically considered by overpricing on fixed priced contracts". (P31; 50; B; MME; Steelwork; PSQ,Q66 and 67).

"No large scale investments have been undertaken and the need for an advanced investment appraisal method involving such factors as risk, obsolescence, etc., has not arisen. But inflation could be indirectly included e.g. by periodic price adjustments". (P33; 3; A; MME; Luxury Yachts; PSQ,Q66 and 67).

"Basically all capital expenditure here has been overdue, and thus, sophisticated investment appraisal has always been overshadowed by need". (P34; 20; B; EE; Cold Rooms; PSQ,Q66 and 67).

"No factors are actually built into the calculations in schedule form". (P35; 20; B; EE; Electric Motors; PSQ,Q66 and 67).

"Taxation, depreciation, etc., are taken into account but investment incentives are normally regarded as a bonus rather than a stimulus". (P38; 8; B; EE; Control Panels; PSQ,Q66 and 67).

"Most investment is of such an important nature that the factors fed into the investment appraisal calculation, e.g. taxation, depreciation, tend to be of relatively minor significance. In any event, risk, inflation, etc., are non-measurable". (P39; 800; D; TLCF; Footwear; PSQ,Q66 and 67).

"Cash flows are simply reduced by 50% when taxation is taken into account. Outlays are similarly amended for depreciation. But inflation, risk, obsolescence, uncertainty, etc., are not assessed". (P40; 158; B; TLCF; Clothing; PSQ,Q66 and 67).

"Obviously, any item which reduces the cash flows would be considered at the time, but there is no formal schedule of rules in operation". (P44; 45; D; BPG; Glass; PSQ,Q66 and 67).

"A trial and error approach to investment is adopted and factors would be included or excluded as appropriate". (P46; 140; C; BPG; Pottery; PSQ,Q66 and 67).

"No factors are taken into account in a formal mathematical way, and most returns are quoted on a pre-tax basis anyway". (P47; 13; B; BPG; Pottery; PSQ,Q66 and 67).

"Some factors are either self-correcting, e.g. inflation, or included informally, e.g. despreciation, but we have no specific investment appraisal method in operation". (P50; 44; C; OMG; Cardboard Containers; PSQ; Q66 and 67).

"No factors are formally considered and there is little need if investment is of a piecemeal replacement variety. However, the emergence of net profit in the accounts over the longer term must reflect to some extent, the indirect inclusion of certain factors". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q66 and 67).

"The decision to proceed or not to proceed with an investment depends to a large extent upon the estimated rate of return. The inclusion of the special factors mentioned would not necessarily affect the overall decision since some items could cancel each other out, e.g. taxation and tax allowances". (P54; 24; B; OMG; Printing; PSQ,Q66 and 67).

"The break-even calculation would always be expressed in net terms but risk, obsolescence, etc., would be excluded". (P58; 17; A; OMG; Plastic Mouldings; PSQ, Q66 and 67).

"Investment viability is based more upon general market conditions and trends rather than on an appraisal method containing all the factors in question". (P61; 124; C; OMG; Joinery Tools; PSQ,Q66 and 67).

"Factors must be assumed to have been considered from a final accounts point of view. For example, some investment is for research purposes and would go ahead irrespective of method, risk, inflation, etc. The extent of viability would be indicated by the resultant net profits". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q66 and 67).

Undoubtedly, the approach to method and the variables to be included, inclined far more towards the trial and error than the mathematical. Whether or not some factors were self-correcting, self-cancelling, and simply non-measurable, remained arguable, but in any event would be no real substitute for rigour. Similarly, although certain types of investment could, indeed, overshadow the calculations, and final accounts could automatically reflect net returns long term, this tended to simply confirm the rule of thumb attitude rather than defend it.

ACTUAL INVESTMENT APPRAISAL EXAMPLES

Although the extracts gave an indication of the investment appraisal techniques, or lack of them, they were

unfortunately, lacking in substance. Consequently, to supplement this general picture, the Plymouth Survey interviewees were asked to provide, if possible, an actual example of an investment calculation undertaken by the firm either currently or in the recent past. A number were obtained of varying quality and detail, but the following were selected for inclusion on the grounds that they:

(i) Covered the range of methods employed by those firms actually using investment appraisal.

(ii) Included all four sizes of firm, i.e. 0-24; 25-99; 100-199; and 200+.

(iii) Involved all production run categories, i.e. "A"; "B"; "C"; and "D".

(iv) Complied acceptably with the original sample distribution by standard industrial classification as per Table 5.15 below.

Table 5.15 Selection of Investment Appraisal Examples by S.I.C. Distribution. Plymouth Survey

S.I.C.	Original 65 firm Distribution	Revised Distribution for 15 Firms	Actual + or - 2 15 firm Distribution
F.D.T.	10	2	1
C.A.I.	2	1	1
M.M.E.	21	5	7
E.E.	5	1	1
T.L.C.F.	6	1	1
B.P.G.	5	1	1
O.M.G.	16	4	3
Totals:-	65	15	15

Source: Plymouth Survey Questionnaires; Questions 4 and 68.

EXAMPLE I

PAYBACK

ITEM	Famco Double Linker (Sausages)
COST	£15,000
JUSTIFICATIONS	(i) Machine replaces 11 operatives; (ii) Improved product; and (iii) Safer / cleaner equipment.
SAVING	Average salary per operative £1,350 11 X £1350 = £14,850
PAYBACK	$\frac{£15,000}{£14,850}$ = 1 year (approx)

(Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 68).

CRITIQUE The whole approach is clearly lacking, although the justifications do comply with the firm's overall investment strategies. However, there is no indication as to whether the project is meant to serve a short or long term purpose. If the latter is the case, for example, then such considerations as the cost and source of capital, investment grants, taxation, and tax allowances, risk, uncertainty, obsolescence, inflation, returns after the payback point, expected demand for the product, opportunity cost, and possible alternative projects should at least be looked at in the investment appraisal calculation. Additionally, the cash flows have been inadequately assessed, no attempt has been made to measure the justifications, and alternative investment appraisal methods, e.g. D.C.F., have not been employed. In other words, the project has been considered in isolation. Whilst the major investment items would undoubtedly receive a more rigorous treatment, it appeared that the smaller expenditures were not subjected to mathematical evaluation.

In the above example, the payback of 1 year (approx.) is economically meaningless since it is certainly over-optimistic, and is merely one asnwer of many which could be quoted.

EXAMPLE II

RATE OF RETURN / NET PRESENT VALUE (RATIO)

Group Expenditure Proposal - Alchemy Project 000's

YEAR	COST	GRANT	DEP'N	GRANT RELEASE	EXTRA WORKING CAPITAL	CAPITAL (CUM)	ESTIMATED PROFIT PRE-TAX	ESTIMATED CASH FLOW POST-TAX
0 (75)	1020					1020		
1 (76)	396	224	98	21	70	1185	133	482
2 (77)		87	138	30	80	1070	312	525
3 (78)			138	30		962	312	203
4 (79)			138	30		854	312	203
5 (80)			138	30		746	312	203
6 (81)			138	30		638	312	203
7 (82)			138	30		530	312	203
8 (83)			138	30		422	312	203
9 (84)			138	30		314	312	203
10 (85)			138	30		206	312	203
11 (86)			31	7		182	179	
12 (87)								
Totals	1416	311				8129	3120	2631

Estimated Rate of Return: $\frac{3120}{8129} \times 100 = 38.38\%$

N.P.V. = -1020 + 482 + 525 + 203 + 203 + 203 + 203 + 203 + 203 + 203 discounted at the standard 30% rate

N.P.V. = -1020 + 371 + 310 + 92 + 71 + 55 + 42 + 32 + 25 + 19 + 15 = 12

N.P.V. = £12,000 (not actually quoted in document)

N.P.V. (Ratio) = $\frac{1020}{1032} = 0.99$

Thus: (i) R/R = 38.38%; (ii) N.P.V. = £12,000; (iii) N.P.V. (Ratio) = 0.99

(P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q68 and document)

CRITIQUE This group project has understandably been accorded some attention. The presentation is of a fair standard with several essentials such as taxation, investment grants, the results of alternative investment appraisal methods, etc., suitably considered. But a number of points invite comment: (i) The 12 year time span is far too long to be reliable; (ii) The cumulative capital employed column has been totalled and used as the outlay for the rate of return calculation; (iii) The pre-tax profit total has been taken for the rate of return calculation rather than the post-tax; (iv) The estimated pre-tax and post-tax profits are unlikely to be as constant as indicated; (v) The 30% standard discount rate for the N.P.V. calculation is rather high, and a lower one could have been more relevant; (vi) The true N.P.V. is £12,000 but this figure was not actually quoted in the document provided; (vii) The N.P.V. (Ratio) of 0.99 and the 38.38% are of little significance when quoted in isolation from alternative projects; (viii) Although the N.P.V. can be presented as an acceptable investment appraisal method, its usage can be seriously undermined if it is employed in ignorance of the mathematical weaknesses of D.C.F; (ix) Desirably, the N.P.V. should be supplemented by an I.R.R. calculation; and (x) Opportunity cost, inflation over the 12 year period, possible obsolescence, risk and uncertainty, etc., have not been catered for.

EXAMPLE III

PAYBACK

Capital Expenditure Application

(1) TITLE - Horizontal Milling Machine, Large Throat

(2) COST - £4,000

(3) ANNUAL COST - Estimated £570

(4) ANNUAL SAVING - Estimated £970 adding to profit; plus £1305 net

(5) PAYBACK BEFORE TAX - $\frac{£4000}{£1305}$ = 3.065 years

(6) PAYBACK AFTER TAX - $\frac{£4000}{£626.4}$ = 6.386 years
(Tax @ 52%)

(7) REASONS - Present machines are of inadequate capacity for the type and quantity of work now being undertaken.

(8) ALTERNATIVES - Sub-contract, or replacement of existing machines every 2 to 3 years

(9) FINANCIAL JUSTIFICATION - Throughput per annum is 3000 units (Speed King Bodies - all types) saving per unit 10 minutes.
Annual saving 500 hours.
Annual labour and overhead saving £1305.
To achieve this on existing machinery is possible, but at the cost of shortening the life of the machine at an annual cost of £656. Purchase of this machine will obviate replacement of 1960 U2 Milling Machine saving a further £314 per year.

(10) APPROVED - Managing Director

(P11; 124; C; MME; Valves and Cylinders; PSQ,Q68 plus document).

CRITIQUE Although the payback evaluation does provide for taxation, alternatives to the project, and financial justifications, the 100% tax allowance in the first year has been omitted, and the estimated returns are perhaps over-reliant upon labour and overhead saving. A rather interesting aspect of the example is that an opportunity

cost has been estimated but the figure is not actually included in the calculations. Indeed, there are, of course, other omissions such as long and short run considerations, cost of capital, returns after the payback point, risk, obsolescence, inflation, the project in isolation problem, etc. For an outlay of £4,000 the appraisal is worthy of more elaboration.

EXAMPLE IV

NET PRESENT VALUE

Division	Machine Tool
Location	Plymouth
Description	Two Horizontal Milling Machines
Date	29 September 1974
Amount	£23,000
Reason	To save on sub-contract work, improve efficiency, and meet increased anticipated loads.

Cash Flows

		Years			
Savings:-	(1)	(2)	(3)	(4)	(5)
Sub-contract hours 10335 @ £1.20	12402	13642	15006	16507	18158
Tax @ 52%		6449	7094	7803	8583
Savings after tax	12402	7193	7912	8704	9575
Depreciation added (taxation method)	(23000)				
Tax savings on £23,000		11960			

(Continued)		Years			
Savings:-	(1)	(2)	(3)	(4)	(5)
Total Cash Flow	12402	19153	7912	8704	9575
Present Value Factor @ 20%	0.83	0.69	0.58	0.48	0.40
Present Value of Cash Flows	10294	13216	4589	4178	3830

N.P.V. = -23000 + 10294 + 13216 + 4589 + 4178 + 3830

= £13107

Annual Operating Rate of Return

YEAR	NET SAVING BEFORE TAX	BOOK DEP'N 10 YEARS	NET OPER-ATING INCOME	ADDIT-IONAL NET INVEST-MENT	% RATE OF RETURN
(1)	12402	1150	11252	23000	48.9
(2)	13642	2300	11342	21850	51.9
(3)	15006	2300	12706	19550	65.0
(4)	16507	2300	14207	17250	82.4
(5)	18158	2300	15858	14950	106.1
Totals:-	75715	10350	65365	96600	67.7

(P14; 468; B; MME; Machine Tools; PSQ,Q68 and document).

CRITIQUE The time span, overall investment strategy, depreciation, taxation, allowances, opportunity cost, cash flow measurement, the discount rate, and annual operating rates of return are all included in the well above average calculation. However, the cash flow period would need an adjustment for inflation, obsolescence, etc., especially in the risk prone machine tools industry. Secondly, although the item is expected to operate for 10 years, the N.P.V. has been evaluated over 5 years only.

Thirdly, no alternative figures have been produced to contrast with the N.P.V. or the annual rates of return. Fourthly, the N.P.V. has not been calculated at discount rates other than 20%, and the I.R.R. has been ignored. Finally, although the approach may be considered adequate for the firm and the purpose intended, it is worth noting that £23,000 is involved, and the appraisal could easily have been developed a little more fully from the treatment demonstrated.

EXAMPLE V

PAYBACK

ITEM	Engraving Machine			
OUTLAY	£5,000			
LIFE	10 years			
SAVINGS	(i)	Obsolete plant	(-)	.....?
	(ii)	Basic earnings	(+)	.....?
	(iii)	Basic operating costs £1500	(-)	1500
	(iv)	Overtime payments	(-)	.....?
	(v)	Overtime earnings	(+)	.....?
	(vi)	Depreciation £500	(-)	500
	(vii)	Miscellaneous e.g. overheads	(-)	.....?
	Net savings estimated £2,000			
PAYBACK	$\frac{£5,000}{£2,000}$ = $2\frac{1}{2}$ years			

(P15; 14; B; MME; Industrial Signs; PSQ,Q68 plus document inspected).

CRITIQUE Whilst acknowledging that the example was given verbally and the figures quoted in round terms, its value as an accounting procedure must be regarded as minimal. For example, no account (in the above) has been taken of such fundamentals as taxation, inflation over the estim-

ated 10 year period, continuing demand for the product, etc. If we are to accept that the majority of this small firm's capital projects are appraised in such an informal way, then any resultant viability would obviously be more the result of the "necessity criterion" than from any investment appraisal expertise.

EXAMPLE VI

RATE OF RETURN

PROPOSED NEW FACTORY AT LEE MILL INDUSTRIAL ESTATE

(i) It is proposed to build a new factory of 20,000ft^2 at Lee Mill Industrial Estate at a net cost of £212,000.

(ii) The existing factories are working at full capacity and no increase in production can be expected.

(iii) Due to lack of space, new models cannot be developed, and sales of existing models will decline as they become dated. It is essential, therefore, that new models are developed.

(iv) The existing premises will not permit the building of new models in the 35ft to 40ft range, even if they could be developed.

(v) In a full year additional profits from extra sales can be expected to amount to £107,180 based on 1975-1976 projections.

(vi) Should sales fall drastically, then it is possible that one of the Lee Mill factories may be used as a warehouse.

(vii) Investigations into factories which can be leased have shown that those at present on the market are either unsuitable due to physical size, terms of lease, or location.

(viii) It should be noted that the lease on the Newport Street premises expires in 1978, and no extension will be granted unless redevelopment plans for the whole site are in an advanced state. It is, therefore, possible in 1978 that alternative premises

will have to be found and should it be desired to redevelop Newport Street, then alternative premises will be required during the redevelopment period.

ESTIMATED ANNUAL PRODUCTION / TURNOVER / PROFIT

Production Items	1975 Units	1975 £	1976 Units	1976 £
P.25 (£3500)	72	252000	120	420000
P.30 (£8500)	--		--	
P.32 (£8500)	80	680000	72	612000
P.33 (£9000)	4	36000	60	540000
P.37 (£15000)	60	900000	60	900000
MS30 (£6500)	4	26000	96	624000
MS33 (£7500)	48	360000	48	360000
Totals:-	268	£2254000	456	£3456000
Profit Requirement 9%		9% of £2254000 = £202860		9% of £3456000 = £311040 giving an increased profit of £107180

Turnover increase 1975-1976 = £1202000

FINANCE

	£
Cost of land	12000
Factory building costs	175000
Additional plant	20000
Additional stock and w.i.p.	30000
Sub-total	237000
Less government grants	25000
	212000
Required return on capital 20% p.a. Assuming a 9% net profit then additional turnover required:- £471111 (actual = £1202000 from 1975-1976 projections)	42400 ↓ (actual £107180 from 1975-76 projections)

It is proposed to finance the cost of building £212000

by borrowing money on a minimum 10 year period either on Phases I and II or on Phase III. At the present time, sources of lending are being actively pursued.

ALTERNATIVE USES

Due to mix in production, it is not possible to quantify a turnover at which factories should be closed.

We are, therefore, assuming that should sales remain at or fall to £2m then either Phase II or Phase III will not be required, and may be used as a warehouse.

Assuming a factory is let as a warehouse, then the income in a full year could be:-

		Phase II		Phase III
		10000 ft^2		20000 ft^2
Rentable area		7500 ft^2		15000 ft^2
		£		£
Rent at, say, 50p per ft^2 average 4 months let		11250		23500
Less cost of staff (2)	£4500		£4500	
Sundry expenses	£1750	6250	£1750	7000
		5000		16500
Profit on £2m sales		175000		175000
		180000		191500
Less cost of borrowed cash		30000		30000
		£150000		£161500

NOTE Running costs, e.g. electricity, rates, etc., have already been taken into account in arriving at the net profit of £175000.

RATE OF RETURN

Expected pre-tax profits from 1975-76 projections £107180
Expected post-tax (52%) profits from 75-76 proj. £ 51446
Required post-tax profits to fulfil 20% R/R £ 42400
Required R/R = 20% from $\frac{42400}{212000} \times 100 = 20\%$

Expected R/R = 24.26% from $\frac{51446}{212000} \times 100 = 24.26\%$
Thus, expected R/R exceeds the 20% standard required.

RECOMMENDATION Project should proceed on the basis of the: (i) rate of return's being in excess of 20%; (ii) old premises's obsolescence; and (iii) contingency plan should sales fall below £2m.
(P20; 120; B; MME; Boats; PSQ,Q68 plus document)

CRITIQUE With £212000 involved a comprehensive appraisal was to be expected. And in most respects the evaluation has been carefully prepared. The proposal is based upon an eight point plan, with supporting data. Estimates of production levels, sales, and profits, are projected to compare most favourably with the required rates of return. A contingency plan is also available in the event of sales falling below the target. A rate of return of 24.26% is calculated and set against the target 20%. Finally, as three basic criteria are met the project is recommended for approval, a conclusion which in general terms would appear to be sound.

On the other hand, certain points arise:-

(i) The projected figures for production, sales, and profits, have been taken over 1975-76 only, and are not, apparently, based upon an acknowledged forecasting technique.

(ii) The projected sales increase of £1202000 appears rather optimistic and in any event, is almost 3 times the turnover required to meet the 9% target.

(iii) The projected profit increase is similarly excessive.

(iv) The source of finance has, at the appraisal stage, not been finalised.

(v) The alternative plan of using a new building as a warehouse might prove to be an expensive exercise

rather than one to contribute to profits.

(vi) The rate of return calculation has been produced on one year's projections only, and future cash flows are obviously assumed to be constant.

(vii) A D.C.F. approach would be infinitely more suitable for an investment of this importance.

(viii) It is arguable that behind all the calculations and projections, the "necessity criterion" is the most significant.

EXAMPLE VII

RATE OF RETURN

I APPLICATION FOR CAPITAL PLAN P.T.D. (2207)

II DESCRIPTION Wickham E.D.M. 1 Sparkeroding machine with 30 amp generator

III ANCILLARY EQUIPMENT Adaptors

IV COST £6697

V JUSTIFICATION Experience on the Wickham has proved to be superior to the Sparcatron. When roughing, it can be left unattended for long periods, and results are repeatable. To date there have been no faults when eroding tungsten carbide.

VI DELIVERY Weeks

VII RATE OF RETURN

Sales p.a. (48 wks X 45 X 90% X £3.25)		= £6320
Labour (52 wks X 45 X £0.77)	= £1800	
Power, etc.	£ 250	
Depreciation (8 years)	£1000	£3050
Annual gross profit		£3270

Rate of return $\frac{3270}{6697}$ X 100 = 48.8%

VIII DECISION Approved.....Date.....

(P24; 200; C; MME; Tool Making; PSQ,Q68 plus document).

CRITIQUE The capital expenditure has obviously been justified more on the grounds that the item is superior to existing machines, than on the inflated and misleading 48.8% rate of return. The presentation can only be described as cursory since it ignores: (i) taxation, which alone would reduce the rate of return to 23.4%; (ii) investment grants (if any); (iii) tax allowances; (iv) inflation over the given eight year span; (v) obsolescence; (vi) finance sources; (vii) opportunity cost; (viii) risk and uncertainty (beyond a 90% sales adjustment); (ix) demand for the product; (x) rigour of cash flow measurement; (xi) cost of capital; (xii) alternative usage, i.e. the "project in isolation" problem; (xiii) alternative investment appraisal methods; and (xiv) discounted cash flow in particular.

EXAMPLE VIII

RULE OF THUMB (PAYBACK)

Boring bar payback = 5 years

Smaller machine tools = 2 years

All calculations and projections, major capital items excluded, are based upon historical data.

(P25; 385; A; MME; Paper Converting Machines; PSQ,Q68)

CRITIQUE Assuming that the more important investments, e.g. extensions to the factory in 1964, 1967, 1970, and 1971, were appraised accordingly, it is nevertheless, rather surprising to discover the highly questionable approach above. It would seem that even the larger units resort to "rule of thumb" on occasions.

EXAMPLE IX

PAYBACK

Cleaning process cost £400
Time saved p.a. 1 hour / engine = 500
500 hours @ 60p (1972) saving £300

Break even point $\frac{£400}{£300}$ = $1\frac{1}{4}$ years

(P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q68).

CRITIQUE An inept appraisal with the majority of factors disregarded.

EXAMPLE X

NECESSITY CRITERION

ITEM 8 ft metal guillotine / folding machine

COST £1500

LIFE SPAN 30 years plus

APPRAISAL Nil - item urgent
Assumed bound to pay for itself

(P34; 20; B; EE; Cold Rooms; PSQ,Q68).

CRITIQUE The total presentation of the "necessity criterion" merely confirms weak investment appraisal rather than excuses it.

EXAMPLE XI

PAYBACK

Plant change over to new building imperative at a cost of £50,000.

Estimated savings: (i) labour £30,000; (ii) misc. £20,000

PAYBACK = 1 year

But ACTUAL payback = $2\frac{1}{2}$ years due to (i) inflationary wages (ii) shortages of raw materials (iii) price increases (iv) rates (v) teething troubles, etc.

(P39; 800; D; TLCF; Footwear; PSQ,Q68).

CRITIQUE An interesting example of how the estimated payback of 1 year finalised at $2\frac{1}{2}$ years as a consequence of the initial under-estimation of the factors quoted, among others. Even allowing for the condensed presentation and round figures, D.C.F. would be well recommended.

EXAMPLE XII

NECESSITY CRITERION

CAPITAL REQUISITION

DIVISION	Plymouth
TYPE	Replacement
AMOUNT AUTHORISED	£2650
DETAILS	Replacement vehicle for JJY914G at a mileage of 107385. Repairs prohibitive and new vehicle price rise imminent.
DATE REQUIRED	31 March 1975 (latest)
ENGINEERING COMMENTS	Nil
CALCULATIONS	Nil
APPROVED	Yes

(P44; 45; D; BPG; Glass; PSQ,Q68 plus document)

CRITIQUE Investment appraisal involving the necessary factors for accuracy, and a satisfactory equipment replacement technique for vehicles, have not been applied. Even on a "necessity criterion" basis, it is possible

that alternative vehicles with higher returns would be available.

EXAMPLE XIII

PAYBACK

MARKET DEMAND Funeral requirements depend on death rate. Death rate is 1.2% of population. Population assumed to be increasing.

MARKET SUPPLY Solid timber reduced by Dutch Elm Disease. Replaced by veneer coffin sets.

INVESTMENT £10,000 veneer equipment.

RETURNS Estimated £3200 per month. Profit margin 11%.

PAYBACK $\frac{£10,000}{(£3200 \times 12)11\% \text{ profit mark-up}} = 2.36 \text{ yrs.}$

(P52; 22; D; OMG; Coffins; PSQ,Q68).

CRITIQUE The result is clearly over-simplified. For example, if corporation tax (52%) is taken into account then the payback is raised to 4.9 years. If tax allowances are considered then the payback would be 3.85 years. Additional adjustments for depreciation, inflation, obsolescence, opportunity cost, risk, cost of capital, alternative projects, etc., would affect the payback still further. However, once again, the firm has defended the appraisal on the grounds of urgency in that the equipment was a necessary replacement for the machinery rendered obsolete by Dutch Elm Disease.

EXAMPLE XIV

PAYBACK

CAPITAL ITEM Wharf repair, re-development, and extension approved by the Estates Department.

OUTLAY £273,000

COMPLETION 30 weeks from inception. Payment to occur in stages over the period.

ALLOCATION £200,000 included in 1975 capital budget. Balance of £73,000 provided by reserve budget.

REASONS (i) Necessary to spend the money now to ensure that the quay facilities are maintained.

(ii) State of the quay is deteriorating rapidly and delay could mean additional future expense.

(iii) Quay vital for imports which are expected to increase up to the year 2000.

(iv) Work should commence as soon as possible whilst current importing is at a low level.

(v) Outlay of £273,000 is considered to be the lowest possible tender.

(vi) Alternative quays / ports would involve inconvenience and higher costs.

(vii) Development of the quay would place it within the firm and make it free from nationalisation whilst alternative ports would not be immune.

(viii) Other ports come under the jurisdiction of the National Dock Labour Board where demarkation disputes persist. The firm's own direct labour is always to be preferred.

(ix) It is estimated that £2500 was saved on sheet materials in 1974 through the use of direct labour.

(x) The payback estimate is considered to be satisfactory.

DETAILS OF COST

Lowest tender	£253,000
Consulting Engineers' fee and other professional expenses	£ 20,000
	£273,000

PAYBACK The port life is estimated at at least 20 years. Assuming a life span of 10 years only, the net returns are expected to be in the region of £100,000 giving a payback of $2\frac{1}{2}$ years gross. Tax allowances:- 50% initially and 4% annually.

(P60; 106; C; OMG; Building Materials; PSQ,Q68 and document).

CRITIQUE The document provided gives far more detail than that presented above, but even so, the actual investment appraisal calculation remains obscure. The sources of the £100,000 net returns are not given and the payback is quoted gross. In other words, the figure of $2\frac{1}{2}$ years is meaningless. Indeed, after taxation alone, the payback is nearer 5 years. Although the "necessity criterion" emerges strong in the 10 point argument, the mechanics of the appraisal are insufficiently developed. For example, the time span and the outlay involved would suggest that a D.C.F. approach could be profitably employed.

EXAMPLE XV

INTERNAL RATE OF RETURN

TITLE Gypsum Hopper Extension

DATE April 1974

LOCATION Plymouth

OUTLAY £25,000

CASH FLOWS:-

	1975 (0)	1976 (1)	1977 (2)	1978 (3)	1979 (4)
Labour saved		4109	4602	5154	5772
Fringe benefits		821	920	1030	1154
Materials saved		282	310	341	375
Sub-totals		5212	5832	6525	7301
Depreciation	1943	3685	3365	3045	2724
Taxation (income)		1527	2467	3480	4577
Corp. tax 52%	(1010)	794	1283	1810	2380

(Continued)

CASH FLOWS:-

	1975 (0)	1976 (1)	1977 (2)	1978 (3)	1979 (4)
Net gains		4418	4549	4715	4921
Outlay	25000				
NET CASH FLOW	(23990)	4418	4549	4715	4921

PHASE II

	1980 (5)	1981 (6)	1982 (7)	1983 (8)	1984 (9)	1985 (10)
Labour saved	6464	7111	7822	8604	9464	10410
Fringe benefits	1292	1422	1564	1720	1892	2082
Materials saved	412	453	498	547	601	661
Sub-totals	8168	8986	9884	10871	11957	13153
Depreciation	2403	2083	1763	1442	1120	800
Taxation (income)	5765	6903	8121	9429	10836	12353
Corp. tax 52%	2998	3590	4223	4903	5635	6424
Net gains	5170	5396	5661	5968	6322	6729
NET CASH FLOW	5170	5396	5661	5968	6322	6729

INTERNAL RATE OF RETURN

Net Cash Flows		15%		20%	
Year		Factor	Amount	Factor	Amount
(0)	(23990)	1.0000	(23000)	1.0000	(23000)
(1)	4418	0.8696	3842	0.833	3680
(2)	4549	0.7561	3439	0.694	3157
(3)	4715	0.6575	3100	0.579	2730
(4)	4921	0.5718	2814	0.482	2372

INTERNAL RATE OF RETURN (Continued)

Net Cash Flows		15%		20%	
Year		Factor	Amount	Factor	Amount
(5)	5170	0.4972	2571	0.402	2078
(6)	5396	0.4323	2333	0.335	1808
(7)	5661	0.3759	2128	0.279	1579
(8)	5968	0.3269	1951	0.233	1391
(9)	6322	0.2843	1797	0.194	1226
(10)	6729	0.2472	1663	0.162	1090
NET PRESENT VALUES			1648		(2879)

I.R.R. 1648 + 2879 = 4527

$\frac{1648}{4527}$ X 5% = 1.82%. 15% + 1.82% = 16.82% I.R.R.

(P62; 400; C; OMG; Business Systems; PSQ,Q68 and document).

CRITIQUE The appraisal is really a N.P.V. calculation converted into an I.R.R. The build up is basically sound although the 16.82% by interpolation is actually incorrect. The yield is, in fact 16.6% and this is important since the firm's target rate of return on investment is 15%. But the presentation is well above average with the major factors taken into account, or at least, included in the schedule. However, perhaps 10 years is too long a time span, e.g. in respect of taxation and inflation, and there is insufficient detail behind the cash flows. No alternative projects have been considered, although the firm would normally do this. The interviewees were quite familiar with the mechanics of D.C.F., but were unsure about certain mathematical pitfalls, e.g. multiple roots of the I.R.R.

In summary, we have observed from the methods demonstrated that the firms using the traditional techniques failed, in the main, to take full advantage of

such factors as depreciation, taxation, investment grants (if applicable), tax allowances, inflation, obsolescence, returns after the break-even point, opportunity cost, risk, uncertainty, projected demand for the product, and alternative projects available. On the other hand, in some instances, the "necessity criterion" obviously over-shadowed the need for accurate cash flow and for a correct rate of return calculation.

The companies employing D.C.F. presented much better evaluations, but even so, some omitted several of the above factors; used excessively long time spans; provided obscure cash flows; were guilty of incorrect calculations; and were unaware of the mathematical weaknesses of D.C.F. generally.

It is possible that many firms in the sample did actually realise that discounting had the important advantage of taking into account the time pattern of cash flows together with the cost of capital, and that other methods which did not do this could be considered inferior for most purposes. And yet it has been shown, and stressed, that many investments were undertaken without discounting techniques being used. Two main reasons have been put forward in defence of this practice. There may sometimes be a reason of over-riding importance which would make a precise evaluation of costs and returns by any method inappropriate, and although almost all projects are surrounded by a certain degree of uncertainty, some are more uncertain than others. In view of this, it would seem possible, but by no means certain, that firms could get near to the "correct" decision in the long term without the application of mathematical techniques. In other words, they achieve satisficing returns. But are these satisficing returns the optimum? If firms fail to include all relevant data in their calculations,and

as a consequence forego the project, then they automatically reduce their attainable returns.

Paradoxically, it has been argued that the distinction between satisficing and maximising is not important in economic theory (18). For in the first place the psychological evidence on individual behaviour shows that aspirations tend to adjust to the attainable. Hence, in the long run, the level of aspiration and the attainable will be very close together. Second, even if some firms satisficed, they would gradually lose out to the maximisers, who would make larger profits, and grow more rapidly than the others. But the economic environment of the firm is complex, and it changes rapidly. There is no a priori reason to assume the attainment of long run equilibrium.

One is tempted to conclude that whilst the sample firms could be described as satisficers, they nevertheless, missed viable investment opportunities and effectively undermined even satisficing returns by inadequate investment appraisal.

Part I has demonstrated the weaknesses of the firms' investment strategies. The aim of Part II is to examine investment performance by means of rates of return, pricing, output determination, and accounting functional relationships.

SUMMARY

COST OF CAPITAL In general terms, the cost of capital was difficult to define, but as far as the Plymouth Survey firms were concerned, this had to be taken as that which individual companies either "calculated" or simply believed the cost to be.

CALCULATION OF INVESTMENT PROJECTS The consolidated schedule of main investment appraisal methods used by the Plymouth Survey firms confirmed that 68% used the traditional techniques; 17% employed N.P.V. or I.R.R; and 15% used trial and error methods, or none at all. Of the 83% in the population not using D.C.F. as a main method, 48% claimed to be aware of the importance of D.C.F. although in essence, no firm in the entire sample was totally familiar with the pitfalls of the technique.

DISCOUNTED CASH FLOW STRENGTHS D.C.F. stresses that £1 today is always worth more than £1 tomorrow; considers present values rather than paybacks or rates of return; automatically takes depreciation into account; and enables adjustments, e.g. inflation, to be made more easily. Yet, in the Plymouth Survey, only 17% used D.C.F.

DISCOUNTED CASH FLOW WEAKNESSES The N.P.V. and the I.R.R. can produce inconsistent results. For example, different N.P.V's occur from the employment of different discount rates, and I.R.R's can be identical for non-identical projects. Moreover, the I.R.R. is subject to the multiple roots problem. However, most of these, and other, weaknesses can be overcome by simple modifications to the methods. Unfortunately, no firm in the sample was totally familiar with these issues.

SELECTION OF THE INVESTMENT APPRAISAL METHOD Firms which did actually use some method of investment appraisal were not always clear how, or why, the technique had been selected in the first instance, and 59% simply claimed their method to be of traditional origin. Practically no firm had been influenced by the literature on

the subject.

ASSESSMENT OF CASH FLOWS Well over 50% pointed out that the estimated net returns were simply based upon a loosely defined miscellaneous savings criterion. Advanced forecasting of cash flows was not in evidence.

REVISION OF INVESTMENT APPRAISAL METHODS Nearly 60% of the sample using traditional methods admitted to no major amendments in system or policy and this response was fairly evenly spread among all four sizes of firm. But in general terms the very small companies did not present an encouraging picture of investment appraisal flexibility.

APPLICATION OF MANAGEMENT TECHNIQUES Budgeting in its widest sense, and production scheduling appeared to be the most popular used, but no firm recorded investment appraisal as a major management technique.

FACTORS TAKEN INTO ACCOUNT IN INVESTMENT CALCULATIONS The most significant combination of factors taken into account were depreciation, taxation, and investment incentives, but these inclusions were more pronounced in the larger units. Many other factors, e.g. inflation, obsolescence, cost of capital, alternative projects, opportunity cost, etc., were ignored.

ACTUAL INVESTMENT APPRAISAL EXAMPLES The firms employing the traditional methods generally presented incomplete and inadequate appraisals. On the other hand, the companies using D.C.F. produced much better evaluations but even so, were not immune from criticism. Overall, the investment appraisals and investment strategies practised were inconsistent with the goal of optimisation.

REFERENCES

(1) A. M. Alfred, "Discounted Cash Flow and Corporate Planning", Woolwich Economic Papers No. 3, Woolwhich Polytechnic 1964. S. H. Archer and C. A. D'Ambrosio, "The Theory of Business Finance - A Book of Readings", Macmillan, New York, 1967.

(2) A. M. Alfred and J. B. Evans, "Discounted Cash Flow and Some Short Cut Techniques", Chapman and Hall, 1965.

(3) P. J. Curwen, "Managerial Economics", Macmillan, 1974.

(4) C. J. Hawkins and D. W. Pearce, "Capital Investment Appraisal", Macmillan, 1971.

(5) A. J. Merrett and A. Sykes, "The Finance and Analysis of Capital Projects", Longman, 1963.

(6) R. M. Adelson, Moorgate and Wall Street Review, Spring 1971, pp 43-58. F. B. Pizzala, "The Cost of Capital to the Private Sector - A Critique of Merrett and Sykes", Moorgate and Wall Street Review, Spring 1972.

(7) F. B. Pizzala, Moorgate and Wall Street Review, Spring, 1972, p 62.

(8) Taylor Nelson Investment Services Research Article, "The Why and How of Company Investment", The Director, Nov. 1970.

(9) D. C. Hague, "Managerial Economics", Longmans, 1969, pp 316-317.

(10) Hague, "Managerial Economics", pp 382-389. Hawkins and Pearce, "Capital Investment Appraisal", pp 65-68. Adelson, Moorgate and Wall Street Review, Spring, 1971, pp 54-55.

(11) Curwen, "Managerial Economics", p 159.

(12) J. H. Lorie and L. J. Savage, "Three Problems in Rationing Capital", Journal of Business, Oct. 1955, reprinted in Solomon, "The Management of Corporate Capital", Free Press, Glencoe, Ill., 1959.

(13) Hawkins and Pearce, "Capital Investment Appraisal", Macmillan, 1971, p 32.

(14) R. M. Adelson, "D.C.F. - The Other Point of View", Moorgate and Wall Street Review, Spring, 1971, p 58.

(15) T. Klammer, "Empirical Evidence of the Adoption of Sophisticated Capital Budgeting Techniques", Journal of Business, July 1972, pp 387-398.

(16) "Investment Appraisal", N.E.D.C., H.M.S.O., 1965.

(17) R. M. Cyert and J. G. March, "A Behavioural Theory of the Firm", Prentice Hall, Englewood Cliffs, N. J., 1963.

(18) H. A. Simon, "Theories of Decision Making in Economics and Behavioural Science", American Economic Review, 1959, pp 253-283. Also in G. P. E. Clarkson (Ed) "Managerial Economics", Penguin, Harmondsworth, 1968.

PART II

INVESTMENT PERFORMANCE

CHAPTER 6

INVESTMENT PERFORMANCE BY RATE OF RETURN CRITERION

CHAPTER 6
INVESTMENT PERFORMANCE BY RATE OF RETURN CRITERION

INTRODUCTION

The Bolton Report (1) found that information available on the capital stock of small firms was extremely limited. The problems of putting small firms into their context in national accounts aggregates arose not only from lack of information, but also from conceptual difficulties. The data published in national accounts did not show unincorporated businesses separately from households nor was it at all clear how in practice any really meaningful estimates of capital could be arrived at for small firms.

In disclosing profitability the accounts of owner managed businesses were ambiguous in that income of the owners consisted of a managerial salary and a return on capital, the split between the two being arbitrary and largely determined by tax considerations. Further, the smaller unincorporated business in particular did not keep detailed accounts of records that were separate from the proprietors' household accounts; while their capital assets, particularly a dwelling or car, might be used for both purposes in such a way that the cost could not be apportioned accurately, (though it had to be apportioned in an arbitrary manner for tax purposes). For these reasons, the Bolton Committee saw little point in

attempting the exercise of estimating the capital stock of businesses in the small firm sector, and they were not aware of any satisfactory attempts to do so.

However, the Bolton Committee did find that because small firms, on average, used much more labour intensive methods of production than large firms, their share in total capital expenditure was smaller than their share in total output or employment. The Bolton Committee estimated from their questionnaire survey that annual capital expenditure on fixed assets among small firms in manufacturing had averaged only £83 per person employed in the five year period 1964-1968. That compared with a figure of £189 for all firms over the same period (2), and there was some evidence that although capital expenditure per head in small manufacturing firms was actually increasing, it was increasing less rapidly than that for all manufacturing firms, so that the difference between small and large firms was widening (3). On that basis, small firms in manufacturing annually invested some £126m or 9% of total capital expenditure in private sector manufacturing over the period.

Moreover, it is sometimes suggested that small firms are less efficient simply because net output produced per employee (as recorded in successive Censuses of Production), has been substantially lower in small firms than in large. But this interpretation could be too superficial. For example, the 1963 Census of Production showed that net output per person employed in small manufacturing enterprises was some 23% below that in large firms (£1097 per person in enterprises employing under 200 persons against £1425 in larger units). Additionally, net output per person rose with the size of firm even among small firms themselves (4). But this difference in net output per head between small and large firms

does not necessarily indicate a lower level of output per unit of labour input since the units of labour input are not on average the same for small and large firms. For example, small firms pay lower wage rates than larger firms for broadly equivalent grades of labour and hourly earnings are lower still in small firms because of a lower incidence of overtime and shift working (5). There is also evidence that the composition of the labour force differs between small and larger firms so that the skill mix is lower (6).

Thus, whilst it is perfectly possible to produce figures indicating the "efficiency" of small firms, the drawing of meaningful conclusions is far more hazardous. Nevertheless, the Plymouth Survey interviewees were asked to contribute certain data in order that an assessment of investment optimality might be made, and the following questions were put.

What pre-tax percentage return on investment was normally expected? Was this standard percentage rigid or variable? What minimum pre-tax percentage return was acceptable? Were there any specific reasons (if applicable) for failing to reach target rates of return on investment? Were expected rates of return invariably lower than actual? What should the firm do to make investment more efficient? Could anything be done to raise investment returns on current investment? And had the firm ever employed outside expertise to assist with investment appraisal and investment decision making? Despite the problems of data collection and interpretation, an examination of these areas might throw some light upon investment performance.

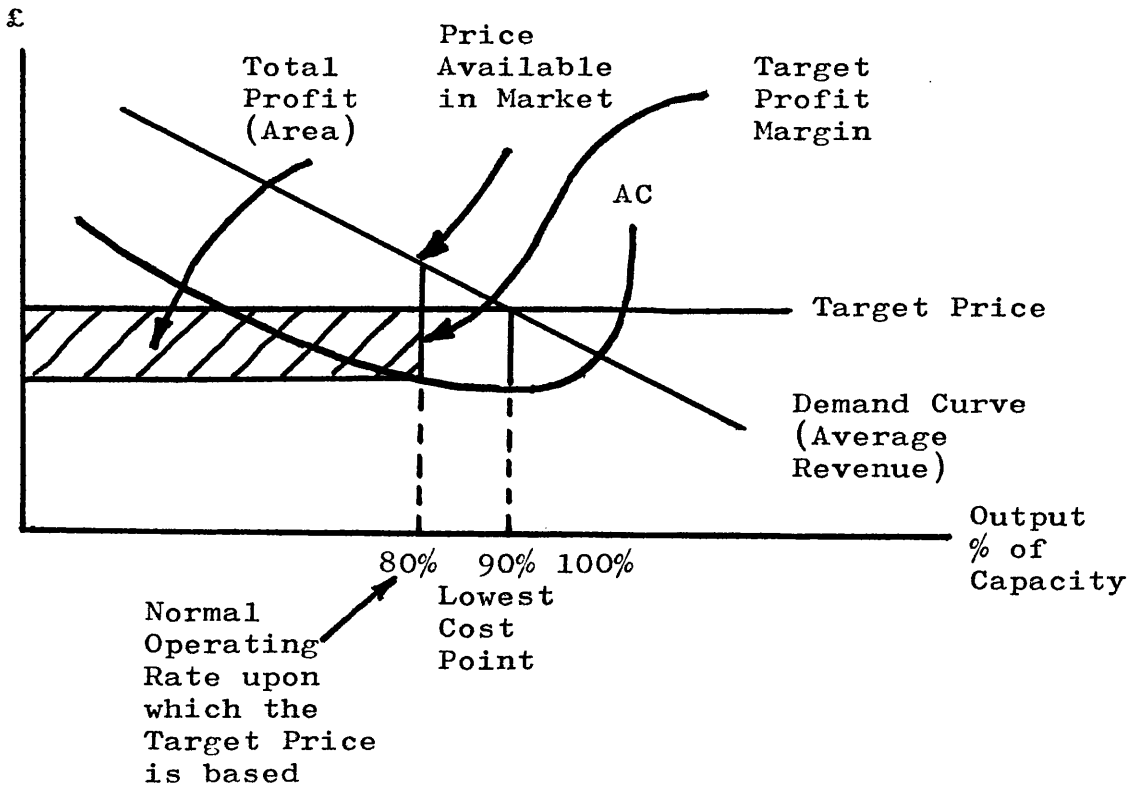
TARGET RATE OF RETURN ON INVESTMENT

Although profit is unquestionably a major concern of small (and large) firms, the evidence is not strong that managerial estimates of the relationship between marginal cost and marginal revenue actually forms the basis for price selection (7). Rather, studies of pricing policies indicate a widespread reliance upon target return pricing methods. For example, the desired profit target may be stated as a profit on sales of 5%, a profit return equal to 10% on total assets, a profit return equal to 15% of net worth (stockholders' equity), a profit return equal to 20% on net worth plus long term debt, or as simply a specific pounds sterling figure. The size of the profit target tends to hinge upon such considerations as industry custom, competitive pressures, what managers believe to be a fair or reasonable return, a desire to equal or better the firm's recent profit performance, a desire to stabilise industry prices, whether the firm's product is new or a unique speciality item, and the firm's related goals of sales, market share, and growth (8). Additionally, specific profit targets tend to differ among industries and firms reflecting differing degrees of competition and differing priorities among alternative goals.

The mechanics of target return pricing may be geared towards pricing to obtain a desired return on sales, i.e. cost plus pricing, or pricing to achieve a target return on investment. In practice, both pricing to achieve a target return on investment, and cost plus pricing offer relatively simple and expedient methods of price determination which have a demonstrated ability to yield adequate, fair, or reasonable profits (9). Once

the target price is chosen, the usual procedure is for the firm to stick by its price and sell whatever amounts of output that short run demand conditions will permit. The target return price is therefore a stable price. However, target return pricing does have the effect of making profits quite variable. On a year to year basis, actual profits may turn out to be either higher or lower than the target profit rate.

Fig. 6.1 The Effects of Demand Fluctuations upon Achieving the Target Rate of Return



Source: A. A. Thompson, "Economics of the Firm", Prentice Hall, Englewood Cliffs, N.J. 1973, p 443

If in a particular year, demand rises and actual output

corresponds to 90% of capacity, then total profits will be pushed up well above the targeted level. However, a decided weakness of target pricing is evidenced by the fact that profits could have been even higher at 80% capacity if the market price (taken from the demand curve) had been selected. It follows, therefore, that target return pricing is not a strategy for maximising profits. Actually, the concept of rigid target return pricing exemplifies a behaviour pattern closely approximating to satisficing. The target rate of return according to the evidence available, tends to be based upon managerial concepts of what is an equitable or reasonable or satisficing rate of return given the degrees of risk and uncertainty involved (10).

Attention may now be turned to the extent that the Plymouth Survey firms employed fixed rates of return on investment. The more rigid the targets and the less likely would be the achievement of profit optimality as per Figure 6.1.

EXPECTED RATES OF RETURN ON INVESTMENT

Firstly, the 1970 Taylor Nelson Survey (11) researched the rate of return on investment required by their sample of U.K. companies. Applying a standard which excluded any special risk factors, among the directors who gave a positive reply, over half plumped for a yield of between 15% - 19% or 5 to 6 years payback. This corresponded closely with the sort of returns produced by the British companies analysed in "The Times 1000" (12). But there was an interesting spread of expectations. A small, though significant, group expected yields of under 14%, while a second perhaps more optimistic category, expected

returns above 20%, i.e. a payback on the investment in 4 years or less. This more optimistic category in the Taylor Nelson sample included relatively few large companies and was made up of mainly small and medium sized concerns. Table 6.1 below summarises the position.

Table 6.1 Rate of Return Expected from Capital Projects Taylor Nelson Survey

Rate of Return	Payback	Firms
Below 10%	Over 10 years	2 (6%)
10% - 14%	7 to 10 years	2 (6%)
15% - 19%	5 to 6 years	11 (35%)
20% - 24%	4 to 5 years	5 (15%)
25% plus	Below 4 years	4 (13%)
Nil response		8 (25%)
Totals:-		32

Source: "The Why and How of Company Investment", Taylor Nelson Investment Services Research Article in "The Director", Nov. 1970.

However, with regard to the Plymouth Survey firms' expected pre-tax % returns on investment, these could only be estimated at best since, for example, several firms adopted different targets for different projects. But one factor was confirmed. Firms using the payback or rate of return methods, i.e. some 85% of the sample, tended to accept the fact that actual returns need not necessarily coincide with the original target. Uncertainty in the market, falling demand, excess capacity, short time working, inflation, shortages of working capital, government price restrictions, high corporation tax, excessive interest rates, foreign competition, and general political uncertainty, were some of the reasons given for the likely shortfalls.

Another problem (outlined in previous Chapters) was that not all firms laid down a specific payback or

rate of return target in that some investment would be undertaken irrespective of the return. Thus, as estimating a return was not easy firms were merely asked to quote the expected rate of return necessary for the project in question to proceed, and Table 6.2 below has been derived from these responses.

Table 6.2 Expected Pre-Tax % Returns on Investment Plymouth Survey

Rate of Return or Pay-back	Employee Groups 0-24	25-99	100-199	200+	Totals
Less than 10% (Over 10 years)	--	--	--	--	--
10%-14% (7-10 yrs)	3 (11%)	2 (12%)			5 (8%)
15%-19% (5-6 yrs)	3 (11%)	2 (12%)	3 (25%)	1 (11%)	9 (14%)
20%-24% (4-5 yrs)	12 (46%)	8 (44%)	5 (42%)	4 (44%)	29 (45%)
25% plus (Below 4 yrs)	2 (8%)	4 (22%)	4 (33%)	4 (44%)	14 (22%)
No targets set	6 (23%)	2 (12%)			8 (12%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 71

Firstly, in view of recent market trends (1970-1975) all firms in the Plymouth Survey tended to require higher returns and raised their targets accordingly. Consequently, comparison with the Taylor Nelson findings (pre-1970) shows a decided uplift in expectations, as Table 6.3 demonstrates.

Table 6.3 Comparison of the Taylor Nelson and Plymouth Survey Expected Rates of Return on Investment

Rate of Return	Payback	Taylor Nelson (Pre-1970)		Plymouth Survey (1970 to 1975)	
Less than 10%	Over 10 yrs.	2 (6%)			
10%-14%	7 to 10 yrs.	2 (6%)		5 (8%)	
15%-19%	5 to 6 yrs.	11 (35%)	MODE	9 (14%)	
20%-24%	4 to 5 yrs.	5 (15%)		29 (45%)	MODE
25% plus	Less than 4	4 (13%)		14 (22%)	
Nil responses	e.g. no targets	8 (25%)		8 (12%)	
Totals:-		32		65	

Sources: "The Why and How of Company Investment", Taylor Nelson Investment Services, "The Director", Nov. 1970. Plymouth Survey Questionnaires, Question 71.

It would probably surprise few boards to learn that with 1975 inflation running at 25% a large number of companies expected a higher rate of return from projects compared with just one year before. Perhaps other directors would be more surprised to read that several firms required only the same return as a year ago. But it must be stated that companies expecting no more than the same yield included a relatively large number of bigger concerns whose targets may well have reflected their estimate of reality rather than what their directors would have wished to realise.

General experience suggests that because of higher costs of money, and rising wage bills alone, firms may have been induced to look for higher yields on their capital investments. It is also important to remember that these required rates of return would not necessarily bring in the same amount of profit as a year ago. In fact, much of the evidence suggested that even while

requiring higher returns from their capital spending, companies have faced steadily falling profits over recent years.

Referring back to Table 6.2 we see confirmed that 45% of the sample required a rate of return of 20%-24% or 4 to 5 years payback, and this was a remarkably consistent target over all four sizes of firm. Similarly, there was also consistency of target among the 14% of firms requiring 15%-19% or 5 to 6 years payback. However, of the concerns expecting 25% and over, or below 4 years payback, the larger firms predominated.

But further interpretation of Table 6.2 (and Table 6.3) would seem to be necessary since the quoting of a fixed rate of return % or payback could easily conceal a flexible target policy. The following extracts, whilst tending to confirm this, serve mainly to elaborate the statistics.

"If investment is short term, i.e. relatively unimportant, then the expected payback would be 1 year. If the item is critical then the expected target would be set at 2 years. On the other hand, building projects would be allocated much longer periods". (Code P1; Employees 486; Production Run Category C; S.I.C. FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 71).

"The target rate of return depends upon the area. Where the firm is well represented, a higher return is expected. But the payback mean has always been 5 years". (P2; 95; D; FDT; Brewing; PSQ,Q71).

"The rate of return depends basically upon the item in question. Occasional heavy investment could be less than the usual 25% target". (P3; 50; C; FDT; Confectionery; PSQ,Q71).

"Usually a 3 to 5 year standard is applied depending on the nature of the project. The current rate of return is taken, and if the new investment is likely to improve this then the spending proceeds". (P4; 600; D; FDT; Baby Food; PSQ,Q71).

"No specific figure is quoted as a non-mathematical approach is adopted. But a 5 year payback or 20% rate of return would be considered to be an appropriate average". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q71).

"No standard rate of return is laid down. If the machine is needed then we would go ahead, but only if we could pay cash". (P7; 20; C; FDT; Minerals; PSQ,Q71).

"If the investment is considered to be vital, then the rate of return would be of little consequence provided that it were positive. However, a 5 year payback would be a normal guideline". (P9; 15; D; CAI; Fertiliser; PSQ,Q71).

"We work on a 15% rate of return plus or minus 5%, the figure depending on the investment type, e.g. the return on the milling machine was estimated at $12\frac{1}{2}\%$". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q71).

"The rate of return, usually 15%, is not necessarily a vital consideration if the investment will raise output significantly". (P12; 8; C; MME; Injection Moulds; PSQ,Q71).

"We expect a rate of return of at least equal to the rate of current inflation, i.e. 25% (1975). In the past we have been content with 10% to 15%. But once the target is fixed, then it tends to be retained for a period of time". (P13; 170; B; MME; Steelwork; PSQ,Q71).

"A rate of return of 40% is expected for investment to proceed unless the project is crucial or non-measurable, e.g. computerisation". (P14; 468; B; MME; Machine Tools; PSQ,Q71).

"No fixed target is set but anything under 5 years would be appropriate depending upon the necessity of the new machine". (P15; 14; B; MME; Industrial Signs; PSQ, Q71).

"No expected rate of return is calculated. If the investment proceeds, then it is assumed to be viable". (P16; 10; C; MME; Press Tools; PSQ,Q71).

"We have adopted a 5 year payback standard or 20% rate of return, but this is rarely applied rigidly". (P17; 90; C; MME; Packaging Machinery; PSQ,Q71).

"No formal calculation is undertaken but a 25% rate of return would be considered to be reasonable". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q71).

"The expected payback on buildings would be about 5 years, whilst on machinery and smaller items, the break even point would be about 2 years. Occasionally, when the investment is considered to be critical, then these standards are waived". (P20; 120; B; MME; Luxury Yachts; PSQ,Q71).

"We require a 33% rate of return or 3 year payback on investment, but in practice the actual return is about half of this". (P24; 200; C; MME; Toolmaking; PSQ,Q71).

"Our capital expected rate of return has been 20%". (P26; 70; A; MME; Trawler Repairs; PSQ,Q71).

"Over the years an informal 6 year payback target has been adopted. Currently, (1975) we would require rather less than this, e.g. 5 years or 20%". (P27; 40; D; MME; Thermowells; PSQ,Q71).

"The target rate of return is influenced by the size of the item, e.g. if small then 33% would be expected, if large, a lower rate of return would be acceptable". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q71).

"Rules of thumb employed to ascertain target rates of return on capital are based upon the following: (i) small (less than £1000) = 65%; (ii) large (greater than £1000) = 22½%; and (iii) vital (any value) = greater than 0%". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q71).

"Generally, the target rate of return is based upon the profit margin employed which is currently 15%". (P31; 50; B; MME; Steelwork; PSQ,Q71).

"The expected rate of return is entirely variable ranging from 0% to 40% depending upon the nature of the project". (P33; 3; A; MME; Luxury Yachts; PSQ,Q71).

"No pre-set targets have ever been laid down but we would consider 20% to be reasonable for most purposes". (P35; 20; B; EE; Electric Motors; PSQ,Q71).

"A target of 3 years payback is employed, but currently (1975) we would require a rather better return than this with the present general uncertainty". (P36; 122; C; EE; Communication Equipment; PSQ,Q71).

"We expect about 20% on capital and would only consider a figure less than this if the investment were of the repair and maintenance type". (P37; 27; C; EE; Location Systems; PSQ,Q71).

"Our standard expected rate of return is 22% or $4\frac{1}{2}$ year payback. But the one-off factory change-over was targeted at 1 year only". (P39; 800; D; TLCF; Footwear; PSQ,Q71).

"A 30% rate of return on investment is the normal target". (P41; 150; C; TLCF; Clothing; PSQ,Q71).

"Normally, we aim for a 20% rate of return although in our current loss making situation we would prefer 40%". (P43; 13; C; TLCF; Wet Suits; PSQ,Q71).

"The balance sheet return on capital ratio has averaged 20% and this figure has been traditionally adopted as the target for all new investment". (P44; 45; D; BPG; Glass; PSQ,Q71).

"A 20% return on capital ratio is required, but this is variable for individual items". (P45; 23; C; BPG; Pottery; PSQ,Q71).

"All investment viability is viewed in the longer term and thus no formal rate of return target is laid down on individual items. For example, if a project paid back in 10 years then that would be an acceptable target in retrospect". (P47; 13; B; BPG; Pottery; PSQ, Q71).

"The expected return depends on the investment, and could vary from 0% to 100%. Generally, the more important the asset and the less important is the rate of return target". (P49; 19; B; OMG; Blinds; PSQ,Q71).

"We would expect at least $12\frac{1}{2}$% on investment (or 8 years payback) and normally we would hope for rather more than this, i.e. $12\frac{1}{2}$% is the minimum target acceptable". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q71).

"A 5 year payback standard is set, but on small or crucial items the rate of return is sometimes irrelevant". (P53; 20; C; OMG; Furniture; PSQ,Q71).

"No target % or payback is adopted. No formal calculations are employed". (P55; 25; A; OMG; Vehicles; PSQ,Q71).

"When investment occurs, e.g. mainly hand tools, a break even factor of 3 to 4 years would be expected". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q71).

"We have always targeted for 25% or 5 years payback on all major investments". (P60; 106; C; OMG; Building Materials; PSQ,Q71).

"A payback of 5 years was expected on our setting up equipment, but on subsequent items, e.g. repairs and maintenance, the target must be lower than this". (P61; 124; C; OMG; Joinery Tools; PSQ,Q71).

"A standard 15% internal rate of return is laid down. The Gypsom Hopper Extension had to produce 15%+ in order to be acceptable. In fact, the yield was estimated at 16.82% and the project proceeded. However, some crucial items have had to be approved on returns less than 15%". (P62; 400; C; OMG; Business Systems; PSQ, Q71).

"The pre-tax % rate of return on investment normally expected depends on the type of investment, e.g. buildings or machinery. But a standard 15% has always been the basic target". (P63; 170; D; OMG; Colour Film Processing; PSQ,Q71).

"Vertical investment would be targeted at 20% whilst other capital spending, e.g. repairs and maintenance, would be set at any figure greater than 0%". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q71).

"We normally require a 40% return on capital spending since damage, etc., is prevalent in this industry". (P65; 30; B; OMG; Tents; PSQ,Q71).

The evidence would appear, at first glance, to support the flexible target argument. However, the overall picture should be viewed cautiously since it does not represent the behaviour of each individual unit. Many firms in the sample did, in fact, employ a fixed rate of return or payback in the short, medium, and even longer term. But others adopted different targets depending on the area of operation; item in question; size of the project; nature of the investment; rate of inflation; profit margin; hist-

orical return on capital ratio; losses sustained; market and political uncertainty; and the return's being greater than 0%. Some companies actually waived the rate of return on certain capital items, others quoted no calculations at all, whilst one firm claimed only to invest if it could pay cash. Again, it was not impossible on one-off jobs for the expected rate of return to be below 0% if a contract were likely to follow. Here, the firm would probably have accepted the prototype first, and then set about acquiring suitable machinery to do the work.

But the main point to emerge from the extracts was that despite the appearance of flexibility, the targets, once set, tended to prevail in the majority of cases, e.g. X% on buildings, Y% on machinery, and Z% on vital investment. Thus, one is bound to infer that, in the main, targeting was somewhat rigid for individual firms, producing satisficing returns on investment at best.

MINIMUM ACCEPTABLE TARGET RATE OF RETURN ON INVESTMENT

Despite the finding that targeting tended to be somewhat rigid, it could not be overlooked that in certain cases a minimum rate of return would be acceptable. Estimating this minimum had, of course, to be considered in the light of the various influences affecting current and expected rates of return in general such as market conditions, political climate, overseas developments, and the necessity criterion. It emerged from Tables 6.2 and 6.3 that whilst some 81% of the sample (14% + 45% + 22%) confidently expected between 15% and 25% plus, a similar proportion, i.e. 82% (45% + 37% Table 6.4), claimed that they would settle, reluctantly, for between 0% plus, and

14%. Or, 45% of the firms expected 20% to 24% but a similar 45% felt that minimum acceptable rates of return could fall between 0% plus and 10%. Moreover, the firms relaxing their targets the most, were prevalent in the 0-24 employee group.

Table 6.4 Minimum Acceptable Pre-Tax % Target Returns on Investment. Plymouth Survey

Rate of Return or Payback	Employee Groups 0-24	25-99	100-199	200+	Totals
Less than 10% (Over 10 years)	14 (54%)	7 (38%)	5 (42%)	3 (33%)	29 (45%)
10%-14% (7-10 yrs)	8 (31%)	8 (44%)	4 (33%)	4 (44%)	24 (37%)
15%-19% (5-6 yrs)				1 (11%)	1 (1%)
20%-24% (4-5 yrs)	3 (11%)	2 (12%)			5 (8%)
25% plus (Less than 4 years)	1 (4%)	1 (5%)	3 (25%)	1 (11%)	6 (9%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 73.

The extent of this lowering of sights could indicate the lack of efficiency in the firms' abilities to meet the targets laid down; the effect of economic uncertainty in the recent past (1970-1975); or a combination of both. However, in view of the evidence presented in previous Chapters, the first mentioned point cannot be dismissed lightly. For example, when actual rates of return on net assets are consulted (developed fully in due course), there is generally an even poorer performance. Whilst several firms had exceeded their expectations, many had

not reached their targets, others had failed to achieve the minimum, and some had sustained losses in the two year period selected. However, before actual returns on capital are examined, a selection of paraphrased extracts is presented in support of Table 6.4 above.

As already indicated, the minimum acceptable target rate of return tended to be determined more by specific circumstances rather than by formula. Consequently, it could vary over periods of time, although some firms had retained their minimum accepted targets on horizontal investment over the shorter term. Some examples of how this target had been fixed during 1975 when the data were collected are as follows.

"The minimum acceptable target could be as low as 0% if exceptional investment were necessary, e.g. to comply with stringent health regulations in this industry". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 73).

"The pre-tax % return normally expected is 20% on routine investment, but since 1965 the actual return on net assets has been nearer 12%. Thus, 12% has become the minimum target acceptable". (P2; 95; D; FDT; Brewing; PSQ,Q73).

"Our target is 25% but if the market produced a lower return and we wished to remain in business then this would be taken as the minimum acceptable for the next period". (P3; 50; C; FDT; Confectionery; PSQ,Q73).

"If health or safety were involved then the minimum acceptable rate of return on that investment would simply be that actually produced by the market, e.g. 0%". (P4; 600; D; FDT; Baby Food; PSQ,Q73).

"We are currently undergoing losses and our negative rate of return on net assets inevitably provides the minimum target for the next year". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q71).

"Given current economic conditions (1975) any rate

of return over 0% would be an acceptable minimum target". (P7; 20; C; FDT; Minerals; PSQ,Q73).

"Minimum targets depend on the type of investment and the need but we would not set our sights lower than, say, a 10 year payback". (P8; 300; C; FDT; Bread; PSQ,Q73).

"If the actual rate of return on investment over the longer term is positive, but below the expected target, then the former is adopted as the minimum return acceptable. Marginal investment, e.g. repairs and maintenance, would be excluded from this rule of thumb". (P9; 15; D; CAI; Fertiliser; PSQ,Q73).

"Over the years a fairly predictable level of output has been sustained and the rate of return has been equally constant at around 20% on net assets. Thus, we have come to regard this 20% as the minimum acceptable target". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ, Q73).

"The minimum rate of return acceptable would depend upon the item in question, but an arbitrary 5% return might be agreed for, say, urgent replacement investment". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q73).

"Any rate of return greater than 0% which achieves the objective of increased output would be regarded as the minimum target". (P12; 8; C; MME; Injection Moulds; PSQ,Q73).

"Although a short run 0% rate of return would not be acceptable by choice but forced upon us by circumstance, it could still pay if an investment saved on overheads over the longer term. Here, any capital spending is regarded as worthwhile if it contributed at all to overhead expenses". (P13; 170; B; MME; Steelwork; PSQ,Q73).

"In machine tools (1975) where performances generally have been below those required for survival, there has been no alternative here but to set the minimum target equal to the necessary rate of return, i.e. 40%, except in instances of non-measurability, e.g. the computer installation". (P14; 468; B; MME; Machine Tools; PSQ, Q73).

"A 25% return is expected and 25% must be obtained otherwise survival would be unlikely. Inflation at 25% and overheads, e.g. rates, have consolidated this policy". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q73).

"A minimum target rate of return has not been considered formally but a 10 year payback would be near the limit permissible". (P19; 60; B; MME; Boats; PSQ,Q73).

"If the investment were vital, then the minimum could be anything greater than 0%. On development investment the actual rate of return if lower than the expected return, would have to be accepted as the minimum". (P20; 120; B; MME; Luxury Yachts; PSQ,Q73).

"Presumably we could come down to, say, 5% on investment if the item were crucial, e.g. boat holding structures, but we would be less inclined to lower our sights on more ambitious spending". (P22; 21; B; MME; Boats; PSQ,Q73).

"Minimum targets depend mainly on the nature of the investment, e.g. we would consider over 5 years on major projects, and over 2 years on miscellaneous to be reasonable minima". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q73).

"A 10 year payback would be extreme in this industry, and one could assume this to be the minimum target acceptable". (P26; 70; A; MME; Trawler Repairs; PSQ, Q73).

"If investment were of a repair and maintenance nature then any contribution would be acceptable. But for vertical investment a minimum of 15% is laid down". (P27; 40; D; MME; Thermowells; PSQ,Q73).

"Actual rates of return can be very low if unavoidable, or necessary, but normally we would not set the minimum below 5%". (P31; 50; B; MME; Steelwork; PSQ,Q73).

"No minimum is formally laid down but, say, 5% to 10% might have to be acceptable depending on the nature of the investment, rate of inflation, etc". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q73).

"The minimum acceptable rate of return on investment is normally taken as that which the market bears provided that it is greater than 0%". (P35; 20; B; EE; Electric Motors; PSQ,Q73).

"A zero rate of return might be unavoidable if the investment item were essential, but we would normally expect the target of 33% to be met on development investment". (P36; 122; C; EE; Communication Equipment; PSQ, Q73).

"If there is no alternative, then that rate of return which makes a contribution would be taken as a guideline for the minimum target acceptable on future investment". (P38; 8; B; EE; Control Panels; PSQ,Q73).

"Actual returns could range from 0% to X% but the minimum target has always been equated with the expected 22%". (P39; 800; D; TLCF; Footwear; PSQ,Q73).

"In the clothing trade, margins tend to be tight and thus minimum targets could not be set lower than 25% or 4 years payback". (P40; 158; B; TLCF; Clothing; PSQ,Q73).

"Any payback in excess of 3 years in textiles would be regarded as the minimum acceptable". (P41; 150; C; TLCF; Clothing; PSQ,Q73).

"The minimum return has subconsciously been taken as that rate borne by the market if less than the expected target". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q73).

"A reasonable minimum rate of return has always been believed to be 10%, but currently (1975) we are forced to consider any contribution to overheads". (P43; 13; C; TLCF; Wet Suits; PSQ,Q73).

"No minimum is set down formally but we would certainly want a return at least equal to trade investments, or bank deposits". (P44; 45; D; BPG; Glass; PSQ,Q73).

"Any rate of return greater than zero to cover fixed costs, e.g. 5%, would be regarded as the minimum". (P48; 25; C; OMG; Furniture; PSQ,Q73).

"Certain investments have to be immune from targets, e.g. safety equipment to comply with the Factories Acts. Thus, minimum rates of return are infinitely variable". (P49; 19; B; OMG; Blinds; PSQ,Q73).

"A 12½% rate of return or 8 years payback has been a minimum applied to such items as improved conditions for staff, and the replacement of a colour printer that was unpleasant to operate, yet profitable". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q73).

"No formal targets are adopted as a rule and any % which indicated viability would be an acceptable minimum. However, the new building was allowed 25 years to payback, but obviously, other items would be expected to yield much higher returns, e.g. 5 years for the new gantry". (P55; 25; A; OMG; Vehicles; PSQ,Q73).

"The minimum acceptable target rate of return is normally taken from the market if less than the expected. In 1974 we expected 15% but the actual from published figures was 8.4%. This lower % is the minimum for 1975". (P62; 400; C; OMG; Business Systems; PSQ,Q73).

"The minimum rate of return depends upon the changing goals of the firm. If survival is the priority then the minimum would be set at some figure greater than 0%". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q73).

"The expected rate of return on investment may be relaxed for specific reasons, e.g. if overall profit is satisfactory". (P65; 30; B; OMG; Tents; PSQ,Q73).

If investment optimisation were to occur then one might reasonably expect the target rate of return to be somewhat variable. But we have already established some evidence of rigidity, and this finding has been reinforced in the extracts above.

Whilst minimum target rates of return could indeed range from 0% upwards, this flexibility tended not to apply to vertical investment. Generally, replacement items were regarded as crucial, along with investment for health and safety, and any return greater than 0% appeared to be acceptable. On the other hand, some firms felt that the minimum target depended on the goals of the company at the time; several regarded the minimum as that actually borne by the market in the previous period; whilst others equated the lower limit with trade investment returns, bank deposit interest, and even the rate of inflation. Very few firms held that any % return over the cost of borrowing would be acceptable on vertical projects, but the majority were quite prepared to exercise some flexibility on non-vertical investment.

It might be suggested here that if firms had extended the latter policy to the former, and provided that the yield had exceeded the discount rate, then investment

optimisation might have been rather more pursuable.

PROBLEMS OF PERFORMANCE MEASUREMENT

Douglas Todd's "The Relative Efficiency of Small and Large Firms" (13) emphasises the fact that the concept of performance or efficiency is notoriously difficult to define in terms of the broad spectrum of economic behaviour. Not surprisingly, it is usual for one to choose a definition of efficiency which is acceptable for the purpose. For the Plymouth Survey, the criterion of rate of return on investment has, of course, been selected. But this is not to deny that economic literature abounds with numerous definitions of efficiency. And it might be opportune at this point to examine some of the ways in which the concept can be applied to the business unit.

Unfortunately, the volume of existing literature which deals with this subject is rather small and empirical research into the efficiency of business units, and of small firms in particular, is almost non-existent. Most approaches to the topic fall into two broad categories. First, there are those discussions of efficiency in the widest sense of overall economic welfare, and relevant criteria for resource allocation. Secondly, we have more specific studies which have tended to concentrate more on public sector analysis and occasionally business enterprise. In the latter group most attention has been paid to the case of large scale operation, and the problems of "managerial capitalism" (14).

However, the fundamental problem of actual performance measurement remains. For example, the engineer might stress the purely physical aspects of the problem. In this context, efficiency could make no reference to

the cost of inputs, or the price of output. Accountants employed on the production side of a business sometimes prefer to use an interpretation which is based on costs. One base which is frequently used is the notion of a standard cost for a particular production process. Having defined such a "standard" the accountant might then concern himself with the ratio of actual cost to the proposed standard cost of output from the given process. In other words, the emphasis is on internal efficiency in terms of the actual cost of factor usage. Wage bargaining bodies make frequent references to labour productivity. Financial accountants find it possible to calculate some forty ratios from accounting data, each of which describes some aspect of a firm's behaviour and which purports to give it some quantitative meaning. The profit margin on sales, the ratio of debt to equity capital, the stocks-sales ratio, and so on, are just a few examples of such data.

Economic efficiency can, of course, be considered in terms of a relationship between inputs and outputs. Stigler, for example, defines efficiency as the ratio:

$$\frac{\text{actual output}}{\text{maximum output}}$$

from given resources, and optimum efficiency (a ratio of unity) is achieved when the value of the marginal product of each productive service equals its alternative cost.

Ideally, one would like to consider and measure the efficiency of a firm with reference to an identifiable and properly specified production function. In a cross section of firms if interest is centred on the efficient production function, then the usual stochastic form is not a correct specification since the error term is one sided only (15). One possible approach is to fit a technically efficient frontier along the lines suggested by

M. J. Farrell (16). In order to employ this method the degree of returns to scale must be specified "a priori" which is a weakness. Also, there is a problem in that the exact positioning of the frontier is sensitive to the presence of extreme observations in the sample. The fact that the method is easiest to apply when the assumption of constant returns is made does little to strengthen the argument.

An alternative approach is to construct a Downie type measure (17) which is really an all-factor productivity index. The two assumptions that labour is paid a wage which is equal to the value of its marginal product, and the opportunity cost or survival rate of return is equal to the mean rate of return for industry, limit the usefulness of the index in a practical situation.

The majority of these indicators are thus limited in their applicability and some simply describe only one aspect of business behaviour. However, two ratios are frequently used as if they were complete indicators of overall performance. These are labour productivity, and the rate of return on net assets. The second of these is perhaps the most often used index of efficiency, and at least one author regards this rate of return as being the recognised efficiency index (18). On the other hand, another devotes a whole book to explain why it should not be regarded as such (19). Nevertheless, since the majority of the Plymouth firms did tend to express their profitability in terms of a "rate of return on capital" this measure was adopted for that survey.

ACTUAL RATES OF RETURN ON NET ASSETS

Actual rates of return were obtained from the firms'

annual returns deposited at Companies House, London, as at December 1975 in the first instance. Further visits were made in due course. Some difficulties were experienced in the collection of up-to-date figures largely as a result of the Plymouth Survey's financial year running from April 1st to March 31st. A balance sheet with a financial year ending at any time between April 1st and March 31st was included in the years 1972-1973 (a broadly expansionary year) and 1973-1974 (broadly recessionary). But it was not possible to inspect more than 45 items as 18 annual returns for 1974 had not been filed, or were not available as at December 1975. (It will be recalled that two firms in the sample were unincorporated). However, the 45 results were subjected to tests 1, 2, 3, and 4, as set out in Chapter 2 in order that the restricted sample might be representative of the whole. Ultimately, the abridged sample finalised at 38 firms covering the period 1972-1974 and satisfied the following conditions. (Chapter 9, of course, is concerned with the full 65 firm sample).

Table 6.5 38 Firm Sample (72-74) Distribution by S.I.C. for Plymouth Area Derived from the Original 65 Firms. Tests 1 and 2

S.I.C. Groups	65 Firm Sample Distribution	38 Firm Sample Distribution	Actual 38 Firm Sample + or - 2
F.D.T.	10	5	6
C.A.I.	2	1	1
M.M.E.	21	14	14
E.E.	5	3	4
T.L.C.F.	6	3	2
B.P.G.	5	2	1
O.M.G.	16	10	10
Totals:-	65	38	38

Source: Plymouth Survey Questionnaires; Questions 4, and 14 to 38.

Table 6.6 38 Firm Sample Distribution by Production Run Categories for Plymouth Area (72-74) Derived from the Original 65 Firms. Test 3

Production Run Category	65 Firm Sample Distribution	38 Firm Sample Distribution	Actual 38 Firm Sample + or - 2
"A"	12	7	7
"B"	20	12	12
"C"	20	12	12
"D"	13	7	7
Totals:-	65	38	38

Source: Plymouth Survey Questionnaires; Questions 7, 85, and 89; and Questions 14 to 38

Table 6.7 38 Firm Sample Distribution by Employee Groups for Plymouth Area (72-74) Derived from the Original 65 Firms. Test 4

Employee Groups	65 Firm Sample Distribution	38 Firm Sample Distribution	Actual 38 Firm Sample + or - 2
0- 24	29	15	13
25- 99	17	10	10
100-199	11	7	7
200+	8	6	8
Totals:-	65	38	38

Source: Plymouth Survey Questionnaires; Questions 1 and 14; Questions 14 to 38

Table 6.8 Actual % Returns (non-real) on Net Assets (72-74) by Employee Groups - Plymouth Survey

Return on Net Assets	Employee Groups 0-24	25-99	100-199	200+	Totals
Below 0%	2 (15%)	2 (20%)	1 (14%)		5 (13%)
0% - 10%	2 (15%)	2 (20%)	2 (28%)	1 (13%)	7 (19%)
10% - 14%	1 (8%)	1 (10%)	1 (14%)	1 (13%)	4 (11%)
15% - 19%	1 (8%)	2 (20%)		1 (13%)	4 (11%)
20% - 24%	1 (8%)		2 (28%)	3 (36%)	6 (16%)
Over 25%	6 (46%)	3 (30%)	1 (14%)	2 (24%)	12 (31%)
Totals:-	13	10	7	8	38

Source: Companies House, London, Dec. 1975
Plymouth Survey Questionnaires; Questions 19 & 21

Table 6.9 Individual Returns (non-real) on Net Assets.(%)
38 Firm Sample (72-74). Plymouth Survey

	Employee Groups				
	0-24	25-99	100-199	200+	
	6.99	4.94	12.11	22.90	
	4.59	18.94	8.67	28.99	
	35.07	41.56	47.01	12.30	
	23.78	1.33	22.10	3.69	
	11.46	-45.30	4.01	41.52	
	79.85	27.02	-25.49	19.68	
	-49.01	- 6.41	20.46	20.00	
	-57.54	13.28		23.01	
	104.73	29.05			
	41.37	15.33			
	39.72				
	15.07				Mean for all firms
	29.27				
	285.35	99.74	88.87	172.09	646.05
	13	10	7	8	38
	=21.95	=9.97	=12.69	=21.51	=17.00
	Range	Range	Range	Range	
	162.27	86.86	72.50	37.83	
Standard Deviation	43.93	24.02	21.89	11.13	

Source: Companies House, London, Dec. 1975
Plymouth Survey Questionnaires;
Questions 19, 21 and 72.

(NB)	Sample	Period	NON-REAL Mean R/R %
	38 Firm	1972-1974	17.00
	38 Firm	1970-1975	15.64
	65 Firm	1970-1975	16.29

Although it is not a prime objective of this work to compare the efficiencies of small and very large firms (indeed, only 9 firms over 200 employees are included in the 65 firm sample), it would be of passing interest to touch on this subject bearing in mind the limited data available from the Plymouth Survey.

Baumol (20) has argued that as firms grow larger, profit maximisation as such is replaced by sales maximis-

ation subject to some minimum profit constraint. In a more dynamic framework this can be formulated in terms of maximisation of the rate of growth of sales, i.e. share of the market. Since sales increase with size, profits do also, but at a decreasing rate. In other words, there is a direct and positive relationship between firm size and profitability, with profits rising at a decreasing rate. It must be mentioned here that Baumol's analysis is intended as an explanation of behaviour of the larger and more oligopolistic companies.

Both Marris (21) and Edith Penrose (22) argue that there is no relationship between size of firm and rate of return. Briefly, the argument is that firms in the process of growth find that their organisations must change in order to adapt to their new size. Economies of scale provide growth opportunities for any firm which is able to take advantage of them and hence managerial capacity sets the limit to expansion. Economies of growth exist for all sizes and types of firm.

These two hypotheses (among others) differ quite sharply and lead to different predictions about industrial and market structures. It would seem important therefore to see which of these hypotheses (if any) is supported by existing empirical evidence, including that taken from the Plymouth Survey. It must be stated at the outset that empirical studies of this nature are plagued by problems of data specification, definition of variables, and so on. These make it somewhat difficult to draw firm comparisons between the various studies.

S. S. Alexander (23) in his study of 1937 company data in the U.S.A. concluded that among positive income firms there was a slight tendency for smaller units to be more profitable than the larger ones, but that in the total sample this effect was swamped by the large number

of negative profit takers among the small companies. Alexander also found that the profitability of small firms was much more variable than in the larger companies. This finding certainly coincides with the Plymouth Survey data.

A study by H. O. Stekler (24) for the mid 1950's, again in the U.S.A., showed that profitability in positive profit earning firms increased between the small and medium sized firm, and then declined between the medium and larger firms. Overall, profits were observed to decline with increased size, and between size classes the profits of the smaller firms were the more variable. Again, this is confirmed by the Plymouth sample. (Table 6.9).

Hall and Weiss (25) drew a sample of 341 U.S. firms from the "Fortune 500" largest industrial corporations over the period 1956-1962. Their results based on an examination of relationships between the rate of return on equity capital (net assets) tend to support Baumol's hypotheses, i.e. profitability increases with size but at a decreasing rate. In drawing their sample from the top 500 largest companies, the authors were confining their study to the upper tail of the size distribution which is necessary if a valid comparison with Baumol is to be made.

Hart (26) in a recent study finds that provided that the deficit corporations are excluded, there is a slight tendency for profits to increase with size but at a decreasing rate. Once the deficit companies are included, (as with the Plymouth Survey) then profitability and size are found to be independent. The Plymouth Survey results also gave some hint of this independency.

The general conclusions from the United States studies are not entirely consistent. If one considers positive income earners only, then profitability and size of firm are seen to be related in negative fashion. Once the deficit companies are included, then profitability

and size seem to be independent. In all relevant cases, the profits of the smaller firms are more variable than those of the larger units. Interestingly, the Plymouth Survey results were by no means at variance with these findings.

EVIDENCE IN THE UNITED KINGDOM

Samuels and Smyth (27) took a cross section sample of 186 U.K. manufacturing, distribution, and mining companies from 1954-1963. The sample was drawn at random and was grouped into ten size classes according to net assets in 1954-1963.

Table 6.10 Relationship Between Returns (non-real) on Capital and Size of Firm

Size of Firm by Net Assets (£)	Mean Rates of Return (Average 1954-1963)	
Less than 250,000	18.70%	Mean = 18.25%
250,000 - 500,000	15.68%	Standard
500,000 - 1,000,000	20.39%	Deviation = 2.38%
1,000,000 - 2,500,000	17.52%	
2,500,000 - 5,000,000	15.65%	
5,000,000 - 10,000,000	15.83%	
10,000,000 - 15,000,000	16.09%	
15,000,000 - 35,000,000	13.48%	
35,000,000 - 65,000,000	16.47%	
Over 65,000,000	13.93%	
Mean for all classes:-	16.37%	
Standard deviation for all:-	2.07%	

Source: J. S. Samuels, and D. Smyth, "Profits, Variability of Profits, and Size of Firms", Economica, May 1968.

The authors found that smaller firms had more variable profit rates than the larger firms. They also noted that

there was a marked difference in the variability of profit rates between firms with net assets greater than £1m and those with assets less than this figure. Again, it is notable that the 18.25% mean (non-real) for the above firms with less than £1m net assets, compares reasonably with the 17.00% mean rate of return (non-real) for the 38 firm Plymouth Survey.

Samuels and Smyth do not say what number (if any) of the firms in the smallest size classes were deficit companies. This was found to be important in the United States studies, and in the Plymouth Survey. The fact is that the economic process as we know it does generate firms which sustain losses, and a representative number of these relative to the population should be included in all samples. In the Plymouth study some 13% of the 38 firm sample were deficit companies at particular points in time. The U.S.A. evidence on the whole suggests that it is only the inclusion of these firms which makes for independence between size and profitability.

In a comprehensive study of four industries, Singh and Whittington (28) consider a number of hypotheses which relate to size, profitability, and growth of the firm. The behaviour of some 450 quoted public companies for the clothing and footwear; food; tobacco; and non-electrical engineering industries was examined over 1948-1954 and 1954-1960. It was found that average profitability was on the whole lower, the larger the size of firm. The linear regression analysis of profitability and size indicated that no linear relationship existed between these two variables where all firms were considered. In fact, a small and inverse linear relationship between size and profitability resulted when non-growing and loss making companies were excluded from the analysis. This was thought to be due to the greater number of rev-

aluations which take place in the larger firms. The Samuels and Smyth finding that smaller firms showed greater variability in profit rates was confirmed, but this tendency was not so strong as that in the former study, or indeed in the Plymouth Survey.

Finally, the Bolton Committee (29) took these findings and concluded that there was no evidence for assuming that small firms were in general any less efficient than large, or vice versa. And they also confirmed the greater variability in the profits of small firms compared with large.

Table 6.11 Rate of Return (non-real) on Net Assets for all 4 Industries in Total. Singh and Whittington Study

Net Assets £m	Mean Rate of Return on Net Assets	
	1948-1954	1954-1960
Less than 250,000	22.3%	14.7%
250,000 - 500,000	21.1%	16.6%
500,000 - 1,000,000	21.2%	17.3%
1,000,000 - 2,000,000	20.6%	17.0%
Over 2,000,000	19.8%	17.9%
Mean:-	21.0%	16.7%
Standard Deviation:-	0.91	1.21

Source: A. Singh and G. Whittington, "Growth, Profitability, and Valuation", Cambridge Univ. Press, 1968.

In conclusion, in almost every case the evidence seems to indicate that when deficit companies are included in the sample, then profitability and size of firm are independent. At least, if any association is found then it is very weak. When positive income companies only are considered (a somewhat doubtful procedure) then a weak inverse relationship between size and profitability is observed. In all cases though, the variability of

profits is higher in the smaller size classes. Greater variability of profits in the smaller firms could reflect the fact that on the whole, small firms tend to be engaged in a relatively small number of trades. Larger firms, being more diversified, are able to spread business risks more widely. A further factor is that small firms tend to have fewer customers and hence there is a greater incidence of risk embodied in this dependence. Incidentally, it will be recalled from Chapter 2 that diversification was not popular among Plymouth Survey small firms generally.

EXPECTED AND ACTUAL RATES OF RETURN COMPARED

When expected and actual rates of return are compared, there is a significant shifting of emphasis. For example, 67% of the Plymouth Survey population expected a rate of return of 20% or over, but only 47% actually achieved this. Further, no firm had expected a return of less than 10%, but 32% of the sample were unable to reach this level. Even more disturbing was that 13% of the population produced negative returns and no firm had anticipated losses when investment had taken place.

Table 6.12 Comparison of Expected, Minimum, and Actual Returns (non-real). Plymouth Survey 38 Firm Sample (1972-1974)

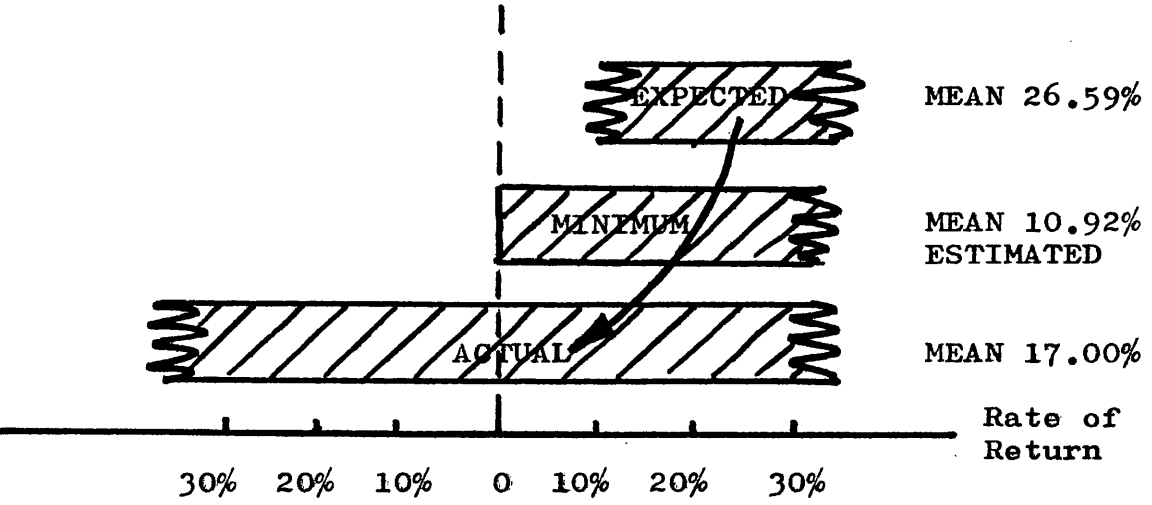
Rate of Return	Expected Rate of Return	Minimum Rate of Return	Actual Rate of Return
Less than 0%			5 (13%)
0% - 10%		29 (45%)	7 (19%)
10% - 14%	5 (8%)	24 (37%)	4 (11%)
15% - 19%	9 (14%)	1 (1%)	4 (11%)

Table 6.12 (Continued)

Rate of Return	Expected Rate of Return	Minimum Rate of Return	Actual Rate of Return
20% - 24%	29 (45%)	5 (8%)	6 (16%)
25% and over	14 (22%)	6 (9%)	12 (31%)
No targets set	8 (12%)		
Totals:-	65	65	38
Mean Rate of Return	26.59%	10.92%	17.00%

Source: Plymouth Survey Questionnaires;
Questions 71, 73 and 72.
Companies House, Annual Returns, London.

Fig 6.2 Comparison of Expected, Minimum, and Actual Returns (non-real). Plymouth Survey, Full and 38 Firm Samples



Source: Plymouth Survey Questionnaires;
Questions 71, 73 and 72.
Companies House, Annual Returns, London.

Thus, whilst several firms had exceeded their expectations, many had not reached their targets. Others had failed to achieve even the minimum acceptable rate of

return, and some had sustained losses. In general terms the mean expected rate of return of 26.59% had suffered an actual 9.59% shortfall to 17.00%.

The deficiencies covered in Chapters 2, 3, 4, and 5 would appear to be supported by actual performance. In Chapter 2 firms had concentrated conservatively on their main products and avoided elements of diversification. Many had expressed their main goal either as "satisficing" or as "survival". In Chapter 3 there was little evidence of positive investment thinking, or resolute management when economic conditions were adverse, short run investment flexibility, long term planning, and vertical capital spending. Basically, a "sleeper" approach was observed. In Chapter 4 firms had used their own finance (mainly) for investment. Very little outside credit had been employed, and the effects of government regional aid had been minimal. Finally, Chapter 5 witnessed weak investment appraisal. The cost of capital was not thought out, very little D.C.F. was used, and there was no flexibility of investment appraisal method. Cash flows were not calculated rigorously, and many investment appraisal factors, e.g. inflation, were actually ignored. As a result it was increasingly suspected that rates of return shortfalls would be likely for certain firms, and the data from Companies House presented above, reinforces this.

In fact, if we examine individual performances we find that 61% of the 38 firm sample actually failed to reach the target set. In other words, just 39% were successful.

Table 6.13 below gives a comparison of individual expected and actual rates of return (non-real) from the Plymouth Survey 38 firm sample. (A more comprehensive picture is presented subsequently in Chapter 9).

Table 6.13 Individual Expected and Actual Rates of Return (non-real). Plymouth Survey 38 Firm Sample (72-74)

Code	Employees	S.I.C	Prod'n Run Cat.	Expected Rate of Return	Actual Rate of Return	Result
P1	486	FDT	C	50%	22.90%	Fail
P2	95	FDT	D	20%	4.94%	Fail
P4	600	FDT	D	25%	28.99%	Success
P5	120	FDT	D	20%	12.11%	Fail
P6	450	FDT	D	22%	12.30%	Fail
P7	20	FDT	C	10%	6.99%	Fail
P9	15	CAI	D	20%	4.59%	Fail
P11	124	MME	C	15%	8.67%	Fail
P14	468	MME	B	40%	3.69%	Fail
P17	90	MME	C	20%	18.94%	Fail
P19	60	MME	B	25%	41.56%	Success
P20	120	MME	B	50%	47.01%	Fail
P21	1	MME	A	20%	35.07%	Success
P24	200	MME	C	33%	41.52%	Success
P25	385	MME	A	50%	19.68%	Fail
P26	70	MME	A	50%	1.33%	Fail
P27	40	MME	D	20%	-45.30%	Fail
P28	4	MME	B	20%	23.78%	Success
P30	30	MME	B	22%	27.02%	Success
P31	50	MME	B	50%	- 6.41%	Fail
P32	140	MME	A	20%	22.10%	Success
P34	20	EE	B	20%	11.46%	Fail
P35	20	EE	B	20%	79.85%	Success
P36	122	EE	C	33%	4.01%	Fail
P38	8	EE	B	20%	-49.01%	Fail
P39	800	TLCF	D	22%	20.00%	Fail
P41	150	TLCF	C	33%	-25.49%	Fail
P46	140	BPG	C	20%	20.46%	Success
P49	19	OMG	B	50%	-57.54%	Fail

Table 6.13 (Continued)

Code	Employees	S.I.C	Prod'n Run Cat.	Expected Rate of Return	Actual Rate of Return	Result
P50	44	OMG	C	20%	13.28%	Fail
P53	20	OMG	C	20%	104.73%	Success
P54	24	OMG	B	20%	41.37%	Success
P55	25	OMG	D	20%	29.05%	Success
P57	2	OMG	A	33%	39.72%	Success
P58	17	OMG	A	20%	15.07%	Fail
P61	24	OMG	C	20%	29.27%	Success
P62	400	OMG	C	15%	23.01%	Success
P65	30	OMG	B	40%	15.33%	Fail
			Means:-	26.15%	17.00%	
			Shortfall:-		9.15%	
		Standard	Deviations:-	11.36%	29.75%	
			Failures:-			23 (61%)
			Successes:-			15 (39%)

Source: Plymouth Survey Questionnaires;
Questions 71 and 72
Companies House Annual Returns, London.

Bearing in mind the somewhat limited sample, analysis by employees, standard industrial classification, and production run category suggests that the most successful units, from a target achievement point of view were the specialist (and "C") firms producing OMG with between 0-24 and 100-199 employees. On the other hand, the least successful were the firms with between 24-99 staff involved in long production runs in the FDT and EE industries. If we, for example, define the 24-99 employee group as "intermediate size" then the apparent inferior performances would appear to compare with the similar poor results of group £250,000 to £500,000 (net assets) from the Samuels and Smyth study as presented in Table 6.10.

Table 6.14 Rate of Return Success and Failure by Employees Groups. Plymouth Survey 38 Firm Sample (72-74)

Result	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Failure	7 (53%)	7 (70%)	4 (57%)	5 (62%)	23 (61%)
Success	6 (47%)	3 (30%)	3 (43%)	3 (38%)	15 (39%)
Totals:-	13	10	7	8	38

(NB) Sample Comparisons

Sample	Period	Failure Rate	Success Rate
38 Firm	72-74	61%	39%
38 Firm	70-75	68%	32%
65 Firm	70-75	64%	36% (Reference Capsule XII Chapter 9)

Source: Plymouth Survey Questionnaires;
Questions 71 and 72
Companies House Annual Returns, London

Table 6.15 Rate of Return Success and Failure by S.I.C. Plymouth Survey 38 Firm Sample (72-74)

S.I.C.	Fail	Success	Totals
FDT	5 (83%)	1 (17%)	6
CAI(*)	1(100%)		1
MME	8 (57%)	6 (43%)	14
EE	3 (75%)	1 (25%)	4
TLCF(*)	2(100%)		2
BPG(*)		1(100%)	1
OMG	4 (40%)	6 (60%)	10
Totals:	23 (61%)	15 (39%)	38

(*) not necessarily significant 100%

Source: Plymouth Survey Questionnaires;
Questions 71 and 72
Companies House Annual Returns, London

Table 6.16 Rate of Return Success and Failure by Production Run Category. Plymouth Survey 38 Firm Sample (72-74)

Result	Production Run Categories				
	"A"	"B"	"C"	"D"	Totals
Failure	4 (50%)	7 (58%)	6 (54%)	6 (85%)	23 (61%)
Success	4 (50%)	5 (42%)	5 (46%)	1 (15%)	15 (39%)
Totals:-	8	12	11	7	38

(NB)

"A" = specialiser, i.e. negligible production runs

"B" = differentiator, i.e. restricted runs

"C" = standardiser, i.e. extended runs

"D" = repeater, i.e. continuous runs

Source: Plymouth Survey Questionnaires;
Questions 71 and 72
Companies House Annual Returns, London

Quite irrespective of how these results might be interpreted, one issue stands reasonably clear; 61% of the sample did not reach the targets set over the two year period. And, in fact, 13 of the 38 firms failed to achieve even half of the expected rate of return. Indeed, firms at the interview stage, i.e. before Companies House data were collected, hinted that the meeting of targets could never be predicted with even restricted certainty. Several possible reasons were offered in explanation, and we may now consider some of these individually.

REASONS FOR FAILING TO REACH EXPECTED RATE OF RETURN

It is observable from Table 6.17 that the major reasons for the failure to reach expected rates of return appeared to be external, particularly inflation and recessionary market and industrial conditions.

Table 6.17 Most Dominant Reasons for Failing to Reach Expected Rate of Return. Plymouth Survey

Reasons:	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Government action e.g. excessive tax price control etc	1 (4%)	1 (5%)	1 (8%)	1 (11%)	4 (6%)
Investment expertise e.g. low vertical investment no long term strategy illiquidity lack of own funds etc	7 (27%)	2 (12%)	1 (8%)	1 (11%)	11 (17%)
Managerial problems e.g. poor forecasting diversification difficulties in setting targets capacity problems small batch production new firm problems slow materials delivery too quality a product high overhead costs material wastages too few new lines fixed price contracts labour problems high wage bills etc	5 (19%)	5 (28%)	4 (33%)	3 (33%)	17 (26%)
External factors e.g. market trends economic conditions inflation competition regionalism oil crises seasonal problems slow payment by customers import costs lower demand government subsidies	13 (50%)	10 (55%)	6 (50%)	4 (44%)	33 (51%)
TOTALS:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Questions 74 & 75

An extension of Table 6.17 may be found in the following extracts provided by the interviewees.

"Actual rates of return were usually higher than expected rates in the past because profit was always ploughed back with the shareholders' approval of low dividend payouts. The company expanded quickly and prospered. But the Unigate take-over stopped this policy with the result that recent returns have been unfavourable, e.g. 1972-74 actual rates of return were about half of those expected. On the other hand, Unigate offered protection but the rate of return was clearly affected by the decelerated investment flow. Additionally, government policy has contributed to poor results by excessive taxation, political uncertainty, industrial unrest, inflation, and so on". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 74 and 75).

"Currently, expected returns are higher than actual. In fact, we have always held the impression that returns could have been higher when good, and should have been higher when poor. Business activity in brewing is usually an inverse function of the economic climate, yet despite recent adverse market conditions, actual returns for 1973-75 were about a quarter of those expected". (P2; 95; D; FDT; Brewing; PSQ,Q74 and 75).

"Returns on net assets have been averaging at about 66%, i.e. 2½ times the required target. But the accounting method could have contributed to this, e.g. no working capital is employed". (P3; 50; C; FDT; Confectionery; PSQ,Q74 and 75).

"During the rather adverse period 1972-74 the rate of return on net assets has been 28.99% compared with the target 25%. Previous returns have invariably been lower than this with the exception of 1969 when 30% was recorded. Our impression is that all returns have been lower than they should have been. For example, the take over disrupted our activities. Some labour redundancies were created; industrial unrest and poor relations followed. Government policy too, must not be excluded from the reasons for poor investment performances, e.g. heavy company taxation. But also, as a result of events, we ourselves could have been guilty of doubtful expertise in investment matters". (P4; 600; D; FDT; Baby Food; PSQ,Q74 and 75).

"Generally, we have tended to be rather more optimistic than actual results have justified, e.g. 1973-75 returns have been about half of those expected. Our policy has been to invest only if we could pay, but currently we are suffering losses. Further, there has been no real history of investment growth within the firm. The company began as a family concern with little desire to invest beyond that level considered appropriate at the time". (P5; 120; D; FDT; Medicated Pastilles; PSQ, Q74 and 75).

"Target returns are usually optimistic as a whole. The market must be the prime cause of our actual result of 12.3% for 1972-74 being just over half of that required". (P6; 450; D; FDT; Meat; PSQ,Q74 and 75).

"Inflation always raises prices more than profit and thus actual rates of return are invariably below target. During the period 1973-75 the expected modest return of 10% suffered a shortfall of 3% owing to a cash flow difficulty brought about by inflation. For example, contract "A1" costs £1,000; sales amount to £1,200; contract "A2" now costs £1,300 which cannot be undertaken without borrowing. Thus, credit for working capital receives priority over investment". (P7; 20; C; FDT; Minerals; PSQ,Q74 and 75).

"Actual rates of return here are greater than target. But sales are maintained from subsidies received from the government, and thus, in real terms returns are below requirement. Some other reasons for this include inadequate plant and machinery, and the overall policy of viewing profit for the group as a whole rather than for individual units. As a result, this branch operates well below optimum". (P8; 300; C; FDT; Bread; PSQ,Q74 and 75).

"Actual and expected returns are not considered in a formal way, but during 1971-73 the former has been about one quarter of the latter. It could be the case that too quality a product is being produced here, and severe competition has lowered the profit which could and should have been made on investment". (P9; 15; D; CAI; Fertiliser; PSQ,Q74 and 75).

"Currently, our actual rate of return on net assets is about 50% below target for 1972-74. But heavy replacement investment does tend to produce this undistinguished effect. Some slight diversification was attempted on our pneumatic range with disappointing results. Also, we have experienced regional problems, e.g. transport,

market trends, etc". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q74 and 75).

"Actual returns on investment are usually less than expected returns partly due to the latter's quickly becoming obsolete after setting, especially during periods of inflation. In any event, it is difficult to know just what the optimum return should be". (P12; 8; C; MME; Injection Moulds; PSQ,Q74 and 75).

"Actual rates have tended to be indifferent due to Plymouth's not being an ideal market for our operations, e.g. we are rarely at full capacity. More centralisation is needed for real expansion to occur. The trade cycle via the building industry, and inadequate government policies have also contributed to our relatively poor performances. Occasionally, targets have been exceeded but probably when set too low". (P13; 170; B; MME; Steelwork; PSQ,Q74 and 75).

"Between 1972-74 our actual return was only one tenth of the target 40%. And if standards have been met in the past it is likely that the setting was too low. But machine tools generally have recorded poor performances quite apart from any investment appraisal deficiences apparent in the firm". (P14; 468; B; MME; Machine Tools; PSQ,Q74 and 75).

"Inflation and economic conditions generally have caused results to be below standard, through higher wage bills, price control, etc. However, suspect investment appraisal, and our excessive bank overdraft have also contributed". (P15; 14; B; MME; Industrial Signs; PSQ,Q74 and 75).

"Presumably all firms can be disappointed, but we are content with our returns which are not excessive. No formal rate of return appraisals are undertaken unless results are critical". (P16; 10; C; MME; Press Tools; PSQ,Q74 and 75).

"Targets set do seem to be either not reached or set too low. 1971 was the only reasonably satisfactory year when 18.9% on net assets was returned against the standard 20%. Recent government policies, or lack of them, e.g. high company taxation, high wages, no market confidence, general industrial depression, oil crises, etc., have been the major reasons for this position". (P17; 90; C; MME; Packaging Machinery; PSQ,Q74 and 75).

"Although certain targets have been achieved, e.g.

12 to 14 boats per year, £5,000 sales per month, etc., returns on net assets have not consistently reached the 25% required. Inflation particularly, and our deliberate slow growth policy might be balmed for this". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q74 and 75).

"Our target rate of return of 25% was about half of that actually reached during 1971-73. But targets have not always been achieved owing to competition, the trade cycle, the impossibility of forecasting in this industry, government inaction, etc". (P19; 60; B; MME; Boats; PSQ,Q74 and 75).

"Recent returns on net assets, e.g. 47.01% for 1971 have compared reasonably with the rather high 50% target expected, whilst others, e.g. 18% for 1974 have not. But one always feels that one could have done better in the light of known errors of judgement. For example, we were at one stage, one boat model ahead of our competitors but this project was regretably abandoned upon breaking even". (P20; 120; B; MME; Luxury Yachts; PSQ,Q74 and 75).

"Basically, we have employed a non-rigorous approach to targets and returns on capital. Nevertheless, we do know that certain actual returns, e.g. 35.07% for 1972-74 have exceeded the 20% target expected. There is always the possibility however, that this target has been somewhat below that which is reasonably attainable". (P21; 1; A; MME; Repair of Cylinder Blocks; PSQ,Q74 and 75).

"Actual rates of return do tend to be unsatisfactory, and there are several possible reasons for this. Inflation is a crucial issue, but we have also cut back our investment programme as a result of a fairly fixed demand over recent years". (P22; 21; B; MME; Boats; PSQ,Q74 and 75).

"Usually, actual returns are below those reasonably expected, and the economic situation (1975) is basically responsible for this. Additionally, competition and the disadvantages of small batch production have also contributed". (P23; 50; B; MME; Iron Castings; PSQ,Q74 and 75).

"If actual returns are below target the source of the problem can be found in the lack of our own investment finance via profit, certain capacity constraints, lack of government control over inflation, and the occasional external crisis, e.g. oil". (P24; 200; C; MME; Tool Making; PSQ,Q74 and 75).

"During the period 1971-73 actual returns on capital (19.68%) have been less than half that expected (50%). Economic conditions, inflation, excessive company taxation, lack of rigorous investment appraisal, and the occasional policy of obtaining an order first and then looking around for a suitable machine to actually do the work, have done considerable harm". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q74 and 75).

"Actual returns for 1972-74 have been a mere 1.33% against a target of 50%. But we have experienced some seasonal labour problems, rising wage bills, increased competition from abroad, and alternative techniques in yacht production at home". (P26; 70; A; MME; Trawler Repairs; PSQ,Q74 and 75).

Currently (1971-74) our returns on capital stand at minus 45.3% as opposed to our target of 20%. Inflation, severe competition, finance shortages, limited capacity, etc., are the most likely causes". (P27; 40; D; MME; Thermowells, PSQ,Q74 and 75).

"Although 23.78% (target = 20%) was recorded for the period 1973-75, returns have been somewhat below the attainable. However, this is a fairly new firm (established in 1966) and we have suffered the usual teething troubles. Consequently, growth by investment has been rather disappointing". (P28; 4; B; MME; Aluminium Castings; PSQ,Q74 and 75).

"Competition, liquidity difficulties, labour shortages, slow payments by customers, and government inability to control inflation, have all combined to produce a climate adverse to the achieving of targets". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q74 and 75).

"Although actual returns (27.02%) for 1971-73 have exceeded the target (22.5%) they have been rather less than they might have been. For example, the cleaning process should have paid back in 18 months; in fact, it took over 3 years. But we are in the hands of a temperamental and competitive market. We have also a rather heavy depreciation and loan repayment problem and the recent new market venture is still to break even". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q74 & 75).

"Targets have been reached in the past although currently they are not. For example, during 1971-73 actual returns were minus 6.41% (target = 15%). Inflation has the effect of keeping the firm one step behind, and

competition in the market merely adds to the difficulties. Also, the very smallness of the firm is not conducive to ambitious investment programmes". (P31; 50; B; MME; Steelwork; PSQ,Q74 and 75).

"Actual and expected returns on net assets have been in equality during 1973-75 (actual 22.1%; target expected 20%). But usually the latter tends to exceed the former due to such factors as inflation, regional difficulties, lack of skilled labour, etc". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q74 and 75).

"Unfortunately, actual returns have been below standard, e.g. 1972-74 target 20%, actual 11.46%. However, other targets have been met such as the raising of export levels. But one vital issue concerns the lack of professional management here, and the absence of rigorous investment appraisal generally". (P34; 20; B; EE; Cold Rooms; PSQ,Q74 and 75).

"Our actual return on capital for 1973-75 has been 4.01% against a target of 33%. Yet this result is probably satisfactory in the light of current economic difficulties, teething troubles of new firm with no history of favourable market conditions, inflation, etc". (P36; 122; C; EE; Communication Equipment; PSQ,Q74 and 75).

"With inflation running at 20% (1974) and 25% (1975) actual rates of return are bound to be deficient, e.g. buy at £20, sell at £22, buy again at £24, etc. The time lag always works against the smaller firm especially if newly incorporated and competition is fierce. Between 1972-74 actual returns were minus 49.01% with a target of 20%". (P38; 8; B; EE; Control Panels; PSQ,Q74 and 75).

"Although actual returns have been more or less up to the standard set, e.g. 1973-75 target 22%, actual 20%, the results are disappointing. This could be due to inadequate forecasting techniques, failure to quantify the non-economic factors in calculations, assuming that the market for footwear is entirely predictable, and under-rating overseas competition". (P39; 800; D; TLCF; Footwear; PSQ,Q74 and 75).

"Recent results have been mediocre largely due to the current economic climate, absence of mass production on certain lines, the difficulties involved in budgeting, unreliable deliveries inwards, and slow payment by customers". (P40; 158; B; TLCF; Clothing; PSQ,Q74 and 75).

"Between 1972-74 actual returns were minus 25.49% whilst the target was 33%. In fact, in 1974 the rate of return was 50% down on 1973. Some possible reasons for this disconcerting state of affairs include the reduced volume of production as a result of foreign competition, heavily rising wage bills, the increase in overheads beyond that budgeted, and slow payment by customers, e.g. 2½% for promptness is no longer an incentive. In fact, legislation to enforce payment within, say, 30 days should be introduced". (P41; 150; C; TLCF; Clothing; PSQ,Q74 and 75).

"Actual returns on net assets do tend to be rather ordinary especially in the building trade. Additionally, our bad debts doubled in 1975 thus reducing the profit from which the rate of return is derived. Further, we have endured a 50% excess capacity, excessive competition, heavy overheads, threshold payments for no increase in production, and liquidity problems, e.g. 90% of our purchases are paid for in 30 days whilst our customers receive 60 days to settle". (P44; 45; D; BPG; Glass; PSQ, Q74 and 75).

"Competition, inflation, and seasonal demand are the major factors causing actual returns to be disconcerting". (P45; 23; C; BPG; Pottery; PSQ,Q74 and 75).

"Assuming that targets are not set too low, returns are normally fairly satisfactory, e.g. 1971-73 target 20%, actual 20.46%. If results have been poor then seasonal forecasting, no mass production for lower costs, competition, and no investment history have been responsible". (P46; 140; C; BPG; Pottery; PSQ,Q74 and 75).

"A target rate of return of 50% on net assets is normally set but between 1971-73 minus 57.54 was recorded. Rivalry, too few new lines, poor cash flow, slow cash payments by customers, and lack of vertical investment have all been contributing factors". (P49; 19; B; OMG; Blinds; PSQ,Q74 and 75).

"Actual returns on net assets have been about two thirds of that required, i.e. 1971-73 actual 13.28% against 20% required. Three main reasons can be identified for this. The severe cycling nature of the manufacturing industries which actually use our cardboard containers. The adverse conditions of 1975 after two good years. And our new plant (in two locations unfortunately) probably came too late and should have been installed 5 years ago. This would have cushioned the rising costs of the current year". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q74 & 75).

"Plant capacity has been, and is, far too low, and certain orders have actually been turned away. Profit has clearly been lost by this. In fact, losses have been experienced recently. More vertical investment in the past would have eased this state of affairs but acute shortages of finance prevented the necessary capital spending at the time. Also, current inflation at 25% (1975) has hindered considerably". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q74 and 75).

"Actual rates, although adequate, have been somewhat lower than the attainable. One reason for this has been the forced change in production methods following Dutch Elm Disease. Secondly, there is the inescapable 50% wastage on materials here. And thirdly, we have undertaken very little vertical investment beyond that forced upon us by events". (P52; 22; D; OMG; Coffins; PSQ, Q74 and 75).

"Actual returns for 1972-74 have been approximately five times the target set. This highly encouraging result has been achieved despite some excess capacity, inflation, and high bank charges. But firm government contracts have counteracted these problems to some extent". (P53; 20; C; OMG; Furniture; PSQ,Q74 and 75).

"Although returns (41.37%) for 1971-73 have been about double the target set (20%) certain work has been lost by competitors' undercutting and then failing to complete the job. Thus, results here might have been even better if these contracts had been secured, and if we had been more investment conscious". (P54; 24; B; OMG; Printing; PSQ,Q74 and 75).

"Actual rates of return have been satisfactory although these are not rigorously appraised. Normally, we have reached our target 20% on net assets but the question is whether this has been set too low or not". (P55; 25; A; OMG; Vehicles; PSQ,Q74 and 75).

"Questionable investment procedures and appraisal techniques employed could have contributed to the occasional inadequate return on capital". (P56; 50; B; OMG; Printing; PSQ,Q74 and 75).

"Actual returns have been indifferent apart from 1972-74 when the target 33% was exceeded by a small margin (39.72%). Undistinguished results have been due to too little time in 5 years to mature as a firm, slow demand build-up, increased use of credit facilities, illiquidity,

and general inflation at 25%". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q74 and 75).

"Returns for 1972-74 have been about three quarters of that needed to reach the target 20%. However, we have recorded some good years in the past, e.g. 1971, but generally the expected return has tended to be rather optimistic. Basic reasons for this might include government stop-go policies, inflation, low demand, and regional problems, e.g. skilled labour shortages". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q74 and 75).

"The building industry cycling problem has caused actual rates of return here to be borderline on occasions. Additionally, targets soon become obsolete, and inflation makes it more and more difficult to achieve the standard set". (P60; 106; C; OMG; Building Materials; PSQ,Q74 and 75).

"Despite the generally adverse economic conditions, profits have been highly satisfactory recently, especially in view of the losses which were sustained in the early 1970's. Between 1973-75 actual returns on capital (net assets) were 29.27% against the target 20%. However, falling demand, some excess capacity, greater reliance on the banks, excessive company taxation, fixed price contracts, inflation, illiquidity, and government uncertainty, have not helped our performances". (P61; 124; C; OMG; Joinery Tools; PSQ,Q74 and 75).

"The basic target of 15% has been exceeded during the period 1973-75 when 23.01% was returned. Nevertheless, rivalry in the market, poor forecasting, and the belated decision to move out of business systems clearly eroded the return which could have been realised in excess of 23.01%". (P62; 400; C; OMG; Business Systems; PSQ,Q74 and 75).

"Returns have fallen short recently. For example, between 1971-73 actual returns were merely one third of the 40% target set. But whatever return we realise we tend to feel that we should have done better. In this instance, however, credit squeezes, late payment by customers, labour problems, etc., have been largely responsible". (P65; 30; B; OMG; Tents; PSQ,Q74 and 75).

Referring back to Table 6.17 emphasising external factors, e.g. inflation and recessionary conditions, as reasons for failure, some 14% of the sample 65 firms claimed the

former to be the most dominant factor, whilst 11% selected the latter. Interestingly, only 6% exclusively blamed government policies for their disappointing results, e.g. excessive company taxation. Many of the reasons given were, of course, specific to each individual firm in its own circumstances as outlined in Table 6.17, but 6% felt that fierce competition had caused actual returns to be but a fraction of those required. And a further 6% endorsed earlier views that the shortage of own funds for investment was the most serious reason for insufficient vertical investment and mediocre returns. But perhaps most significant of all was the fact that only 17% actually admitted the possibility that their inadequate investment strategies, expertise, and mathematical appraisals, could well have caused financial performances to be well below those reasonably attainable.

IMPROVEMENT OF INVESTMENT PERFORMANCES

A Department of Industry Survey (30) carried out during November and December 1975, and published in January 1976, pointed out that manufacturing industry (including small firms, of course) was planning to cut its investment in plant, machinery, buildings, and vehicles, by 5% - 8% during 1976. However, although the survey did forecast a 10% - 15% increase in 1977 this improvement was well below that considered to be the minimum required. The survey, based on 1970 prices and on replies from companies accounting for 45% of manufacturing industry investment, showed that spending by manufacturers was down by 13% on the 1974 levels compared with the 11% - 12% fall estimated on an earlier occasion, and a 15% drop forecast at one stage. A further possible fall of 5%-8%

during 1976 would take investment down to its lowest level since 1964. The increase forecast for 1977 was in the 10% - 15% range but when measured against the estimated 18.5% in the two years to the end of 1976, it merely underlined the depth of the investment recession. And the uncertainties overhanging the economy and company finances simply added cloud to the outlook.

Table 6.18 Manufacturing Industry Real Capital Expenditure 1970-1975 (U.K)

Year	Investment £m	% Change on Previous Year	Cumulative % change on 1970	Index Ratio
1970	2130			100.0
1971	1991	- 6.5%	- 6.5%	93.4
1972	1738	-12.7%	-19.2%	81.6
1973	1864	+ 7.2%	-12.0%	87.5
1974	2087	+11.9%	- 0.1%	97.9
1975	1820	-12.7%	-12.8%	85.4

Source: Department of Industry Survey, Jan. 1976

The C.B.I. believed that signs of the recovery could start to appear by the middle of 1976 but pointed out that many firms were still holding back investment approval because of the question marks about profitability (reference Chapter 3) and the ability to find the funds (reference Chapter 4) to finance new investment. Normally, firms sensing that the recession had bottomed out, should be poised to increase spending to cope with an increased future demand. Unfortunately, as we have witnessed, Plymouth Survey firms' investment strategies did not necessarily include this fundamental principle.

Table 6.18 clearly produces a disappointing picture of investment performance for manufacturing industry

as a whole over the period 1970-1975. At no stage had investment exceeded that for 1970, and the cumulative % change per year column was entirely negative.

Moreover, we have seen from the Plymouth Survey that even when investment had actually occurred, returns had, in the main, been below target. We have also analysed possible reasons for this. But could the firms themselves suggest what might be done to make investment more efficient, and to raise investment returns? These points were put to the Plymouth Survey interviewees and the following extracts give an indication of the action required.

"We could make representations to the parent company for even more investment freedom at local level. We could also spread our sales more widely over the U.K. For example, in some high potential areas we are only returning a 5% turnover. It is possible that investment decisions and returns (22.9% for 1972-74; target 50%) could be favourably affected by more extensive marketing". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 76 and 77).

"There have been certain labour problems in the past, e.g. from the redundancy policy. Good labour relations are essential for profitability. We could also have been far more positive on the investment side, e.g. by opening more plants rather than closing them down. Returns (4.94% for 1973-75; target 20%) could certainly be improved by implementing economies at plant level, and by accepting that the present building is not ideal for keeping costs down. Finally, investment appraisal has not received the priority it possibly deserves". (P2; 95; D; FDT; Brewing; PSQ,Q76 and 77).

"Investment has not been carried out on a continuous basis. The policy has been for capital spending to proceed only if dictated by events. Currently, labour investment (essential here) is being pruned. Returns could well be raised in two ways. Eliminate working capital; and concentrate on raising output rather than profit itself". (P3; 50; C; FDT; Confectionery; PSQ,Q76 & 77).

"The Plymouth plant needs time to adjust to the new take-over situation. Being part of a larger group could on the one hand stimulate investment, but stifle local capital spending and innovation on the other. Improved returns (28.94% for 1972-74; target 25%) could be tied up more with pricing and marketing rather than investment strategy. Price could certainly be used more flexibly, and output could be better scheduled". (P4; 600; D; FDT; Baby Food; PSQ,Q76 and 77).

"We should set our sights for the future more positively and formulate a specific investment programme to raise financial performance, e.g. 1973-75 target 20%; actual 12.11%. A predictable market for the product has generated an inflexible standardisation of production which could only be improved by attempting new lines and finding new markets. But the firm would not find this solution an easy one to implement". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q76 and 77).

"Investment could be made more efficient and returns could be improved (12.3% for 1972-74; target 22.5%) simply by effecting short run economy measures, e.g. use of energy, labour utilisation, etc. Long term results could be stimulated by the implementation of an extended investment programme, but this would require funds which are not available". (P6; 450; D; FDT; Meat; PSQ,Q76 & 77).

"Although actual returns are lower than expected, e.g. 6.99% for 1973-75; target 10%, very little could be done since we are already at the optimum regarding investment. In other words, capital spending which we could afford would not improve performance significantly, whilst that which would raise returns, could not be undertaken owing to the lack of funds and other constraints, e.g. planning permission. However, returns might be improved by increasing prices. We are currently undercutting Corona by 1.5p but the retailers sell at the Corona price. The old re-sale price maintenance actually helped us in this respect." (P7; 20; C; FDT; Minerals; PSQ,Q76 and 77).

"There are several possibilities which might raise investment performance. Abandon our rather negative investment policy, e.g. move into new and more suitable plant. Secondly, invest in one line only. For example, one loaf type would certainly raise profits as a result of lower operating costs. Additionally, subsidiary product production scheduling problems would be eliminated to advantage". (P8; 300; C; FDT; Bread; PSQ,Q76 and 77).

"Raising the 4.59% return for 1971-73 to the target 20% could be attempted by cutting costs and wastage. The evening out of seasonal demand, e.g. by exporting, might also be effective. But mainly, a positive long term investment programme would be required to rectify adverse performances at source". (P9; 15; D; CAI; Fertiliser; PSQ,Q76 and 77).

"Too little investment is undertaken here for progress to be made. We certainly could have been far more adventurous in the past regarding new systems and production methods". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q76 and 77).

"Some of our subsidiary products could be subjected to the make or buy decision, and if the latter were chosen our main item could be allocated longer production runs. Economy drives to raise returns could be costly in themselves, especially in the longer term, e.g. use of skilled labour. We have not considered increasing investment spending specifically". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q76 and 77).

"Although the use of modern investment appraisal techniques might be helpful this would not solve the problem of poor investment performance. We could possibly abandon small batches, and concentrate on the longer runs. But a major decision would be needed for this to be effected". (P12; 8; C; MME; Injection Moulds; PSQ,Q76 and 77).

"Methods of raising investment performance have not been considered on a major scale. But we could decide whether to carry on with miscellaneous expenditure or to undertake the one critical and necessary investment decision. For example, H.Q. should be moved centrally to Bristol. Plymouth is basically unsuitable as a market area, and exporting is not feasible. Steel is far too expensive a product for suppliers to simply coast along. Mere survival demands a continuous effort and this does require a positive investment strategy. In our case this strategy should include the wholesale movement of plant. In the short run, we could raise our wage rates to retain skilled labour occasionally lost to the dockyard, since if labour is poached, our profit is ultimately affected". (P13; 170; B; MME; Steelwork; PSQ,Q76 and 77).

"Returns for 1972-74 (4.69%) have been most unsatisfactory (target 40%). No doubt general techniques could be improved but we should consider alternatives more fully, e.g. do we really need an expensive computer?

Occasionally, parent company influence has been an inhibition on our investment decision making. But mainly the government could help considerably by stabilising the industry. Nationalisation, however, would not be the answer since this merely provides jobs, and different firms cannot be expected to fit into the nationalisation mould easily". (P14; 468; B; MME; Machine Tools; PSQ,Q76 and 77).

"Conceivably, investment performance could be raised by the pursuit of growth, although currently size appears to be about right in relation to order books. Alternatively perhaps, some work study, value engineering, stock control, etc., might help to improve returns on net assets. However, the real issues lie externally with customer demand, competition, government action, etc". (P15; 14; B; MME; Industrial Signs; PSQ,Q76 and 77).

"We invest only if necesaary and if we can pay cash. At the moment there is no real need to undertake capital spending, and therefore, the raising of investment performance is an irrelevance. Techniques and methods could be introduced or improved, but we are content with our current policy and the reliance on memory in financial matters". (P16; 10; C; MME; Press Tools; PSQ,Q76 and 77).

"Actual returns (18.94%) have compared favourably with targets (20%) but the firm could face the decision of entering a higher phase of operation permanently. Piecemeal investment approaches in the past have probably been incorrect but on the other hand the firm has no history of success in investing heavily in fixed assets. For example, when routine production has been increased, valuable one-off jobs have been lost and vice-versa". (P17; 90; C; MME; Packaging Machinery; PSQ,Q76 and 77).

"We could invest more during recessions in preparation for the upturn. Market potential is apparent but we have regretfully not taken full advantage of this. Currently, we could accept the work we cannot complete and sub-contract more. But it would be far more profitable to actually expand via investment, yet it is not our policy to do so". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q76 and 77).

"The return on net assets for 1974 stood at 18% against the target of 50%. But we are probably doing all we can to improve performance. For example, we are moving into the more profitable lines and abandoning the

non-profitable. Also, we are considering economies by introducing certain management techniques, e.g. value engineering. But such measures are expensive in themselves to implement. A further problem is that we are currently over-trading, but we could not cut back on the three new models this year despite the postponement of the new factory at Lee Mill. The models are far too committed for even a temporary output reduction". (P20; 120; B; MME; Luxury Yachts; PSQ,Q 76 and 77).

"Investment returns, although currently good, (actual 35.07%; target 20%), could be improved by exploiting the recently discovered benefits of advertising. Additionally, far more diversification, and total use of manpower would be a significant contribution". (P21; 1; A; MME; Repairs Cylinder Blocks; PSQ,Q76 and 77).

"Investment policy is considered to be adequate and no major changes are needed to improve performance". (P22; 21; B; MME; Boats; PSQ,Q76 and 77).

"The only way to elevate financial performance is to raise the order level but no immediate plans exist to actually attempt this operation". (P23; 50; B; MME; Iron Castings; PSQ,Q76 and 77).

"Basically, investment levels and investment returns are in the hands of the market, competition, and government policy". (P24; 200; C; MME; Toolmaking; PSQ, Q76 and 77).

"Although the return for 1971-73 was 19.68% against a target of 50% on net assets, we have not seriously considered how performance might be improved since, under current economic circumstances, the result is thought to be reasonable. However, certain economies might be implemented but only in the normal course of events". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q76 and 77).

"Despite a return of 1.33% for 1972-74 against a required 50% large scale investment is not contemplated. Economy drives, labour pruning, etc., are to be given priority instead". (P26; 70; A; MME; Trawler Repairs; PSQ,Q76 and 77).

"If accurate forecasting were possible then investment could be much better planned, and the return of minus 45.3% for 1971-73 could have been avoided". (P27; 40; D; MME; Thermowells; PSQ,Q76 and 77).

"A final decision on whether to grow in X years or not would determine the investment programme, and economies, full capacity working, more local one-off jobs, etc., would help to improve the returns". (P28; 4; B; MME; Aluminium Castings; PSQ,Q76 and 77).

"Investment programmes and returns are basically determined by market forces and individual small firms have little chance of influencing these trends". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q76 and 77).

"If the market is slow then investment spending is likely to be slow. In other words, capital expenditure is fundamentally subject to the trade cycle. But an improvement in product quality to gain customers and expand work loads can influence investment independently of industrial trends. Also, a tax reduction by the government would help to provide the necessary funds for new equipment". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q76 and 77).

"Returns for 1971-73 were -6.41% (target 15%). One problem rests on the decision whether to replace labour with capital or not. The choice seems to be between more efficient production with improved returns and some predictable industrial unrest, or labour intensive operation with unsatisfactory financial results but good industrial relations. As yet this issue has not been, and possibly will not be, resolved". (P31; 50; B; MME; Steelwork; PSQ,Q76 and 77).

"Investment could be more efficiently organised if management had a more professional attitude to capital expenditure. For example, little distinction, if any, seems to be made between the long and short runs regarding the installation of new machinery, and occasionally obsolete equipment has actually been purchased. Then to improve returns (11.46% for 1972-74; target 20%) economies have been made but the net effect of these has simply been to reduce the quality of the service rendered to the customer". (P34; 20; B; EE; Cold Rooms; PSQ,Q76 and 77).

"No analysis of investment performance is needed since the return on net assets for 1972-74 was 79.85% (target 20%). Investment has always proceeded as required and this policy is to be continued". (P35; 20; B; EE; Electric Motors; PSQ,Q76 and 77).

"Although the return for 1973-75 emerged as 4.01%

(target 33%) we feel that nothing could be undertaken at the moment to improve this position. Very little could be done externally since we are market determined. However, an investment strategy might be adopted in due course when the firm is fully established". (P36; 122; C; EE; Communication Equipment; PSQ,Q76 and 77).

"Very little could be done to improve capital expenditure efficiency and raise returns since no vertical investment is considered to be necessary at the present time in view of the depressed market situation". (P37; 27; C; EE; Location Systems; PSQ,Q76 and 77).

"Clearly, more vertical investment is required (return for 1972-74 was -49.01%; target 20%), but we are not prepared to undertake this unless the contracts are available in the first instance. Government control of inflation would be of some benefit in this respect". (P38; 8; B; EE; Control Panels; PSQ,Q76 and 77).

"The return of 20% for 1973-75 (target 22%) is subsidised to some extent by H.Q. Profitability should be higher here, and a more rigorous approach to investment appraisal, for example, might have helped in the past. Payback clearly has deficiencies. Moreover, certain economies could be effected especially since the return on the new plant is likely to be much lower than anticipated at the planning stage". (P39; 800; D; TLCF; Footwear; PSQ,Q76 and 77).

"Since we are entirely in the hands of the market we are unsure as to what could be done to raise investment performance significantly. In the past we have simply not been prompted until a crisis occurred which rendered action imperative". (P40; 158; B; TLCF; Clothing; PSQ,Q76 and 77).

"We urgently need more vertical investment to improve the work flow. But since returns for 1972-74 averaged -25.49% (target 33%) we have no funds available for the purpose". (P41; 150; C; TLCF; Clothing; PSQ,Q76 and 77).

"More automated production would certainly improve financial performance but there is a constraint on current funds. Alternatively, we have been pursuing a cost saving policy in order to prevent a loss of government contracts". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q76 and 77).

"Losses are currently being sustained and we see no point in investing for a likely non-existent return. Paradoxically, the market potential is there, but there is also a lack of confidence problem". (P43; 13; C; TLCF; Wet Suits; PSQ,Q76 and 77).

"More market research is needed since estimated market trends seem to be a major problem in glass. Also, we took over a new building 50% too large for the purpose and there are no immediate plans to employ the spare capacity. We could either increase the work here to 100% and hope that the market is available, or we could contract slightly to equate with known current demand. In short, some confusion prevails as to what exactly should be done to improve investment performance". (P44; 45; D; BPG; Glass; PSQ,Q76 and 77).

"Basically, we are in the hands of a seasonal market and an historical approach to investment has seemed to be the only way to proceed. However, we could examine our price stability policy since we probably are not charging what the market will bear at given levels of output. Additionally, we could consider, yet again, the traditional conflict between quality one-off work and mass production items. The latter does tend to be rather more profitable over the longer term". (P45; 23; C; BPG; Pottery; PSQ,Q76 and 77).

"Returns on net assets and targets set have been more or less in equality (20%) during 1971-73, but even so investment performance could be improved by cutting down the number of lines, developing more mass production, implementing general cost economies, seeking out-of-season markets, and possibly, adopting more rigorous investment appraisal". (P46; 140; C; BPG; Pottery; PSQ,Q76 and 77).

"Activity is very much in the hands of seasonal fluctuations, and financial performance could only be raised by diversification, possibly, and the movement into non-seasonal markets. But since this has not occurred, very little investment has been undertaken as a policy, and no overall strategy exists". (P47; 13; B; BPG; Pottery; PSQ,Q76 and 77).

"Recent returns on net assets have been negative (-57.54%). The target (50%) could possibly be reached in time after transition into mass production items with marginal lines dropped, e.g. roller blinds. Investment would then have to take place to produce the necessary

tooling and capacity. Unfortunately, a large amount of finance would be required and this is not available either at firm or bank level". (P49; 19; B; OMG; Blinds; PSQ,Q76 and 77).

"Actual returns (13.28% for 1971-73; target 20%), could be improved by abolishing priority machine policies, and by purchasing all necessary equipment irrespective of cost. Also, our three level production system of heavy, solid, and sub-contracted items could be rationalised. The profitable heavy lines should be developed fully along with the new plastic container in an attempt to be first in the field. Plastic boxes cost 200% more than the conventional but the life span is considerably longer. A decision to move into plastic, however, has still to be made". (P50; 44; C; OMG; Cardboard Boxes; PSQ,Q76 and 77).

"Investment performance might be raised by longer production runs, and by appreciating that despite low capacity production targets have been reached in a given period leading to customer confidence and more following orders which may have to be turned away. The firm must tackle this capacity problem above all, which would certainly involve an investment programme and the raising of finance. But the likelihood of this programme's being implemented is remote". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q76 and 77).

"Known growth of sales is around 10% per annum, and known material wastage is around 50%. Investment is long overdue to cater for the former and rectify the latter. However, despite the priority, this spending has not taken place and there are no immediate plans for its implementation". (P52; 22; D; OMG; Coffins; PSQ,Q76 and 77).

"Investment performance, i.e. the level of spending and the ultimate return, depends almost totally on government expenditure on education. If this expenditure in real terms rises long term, then investment here also increases. But we have never actually anticipated this expenditure and invested in advance for a market upturn". (P53; 20; C; OMG; Furniture; PSQ,Q76 and 77).

"We generally accept that smaller printing units are more efficient than the larger ones with regard to deliveries, quality, and service. On the other hand, longer production runs mean lower costs and higher profits. Theoretically, optimum investment performance requires that a compromise between the former and the

latter be reached, although in the real world it is the market that determines capital spending". (P54; 24; B; OMG; Printing; PSQ,Q76 and 77).

"Returns on capital are not currently under scrutiny since actual profits have exceeded the targets laid down. Nevertheless, economies are constantly being considered but reductions in output to simply reduce costs have traditionally been rejected on the grounds that sales are the critical factor for long term financial success". (P55; 25; A; OMG; Vehicles; PSQ,Q76 and 77).

"No heavy investment is required here as the plant is already capable of more output. It is the demand side that needs to increase. We are very much in the hands of the market and flexible pricing is not an answer because it is known that demand does not react to price reductions, yet it does fall eventually if price is raised. Thus, investment performance can actually be independent of internal decisions". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q76 and 77).

"Despite actual returns (15.07% for 1972-74) falling short of the target (20%) nothing specific has been contemplated to raise performance. Investment has always been piecemeal and has proceeded as and when required by events. Economy drives have little or no effect and mass production is not possible". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q76 and 77).

"It is almost impossible to determine investment performance if one is involved with the building industry with its unpredictable cycles. Economies can always be devised but they can also be costly to implement in themselves. In fact, we have never considered ways of raising rates of return specifically. However, we could emphasise the lower margin products, and we have in fact been looking into this". (P60; 106; C; OMG; Building Materials; PSQ,Q76 and 77).

"If the market were available, a vertical investment programme could be implemented. Very little could be done, however, to raise returns on existing fixed assets in this industry". (P61; 124; C; OMG; Joinery Tools; PSQ,Q76 and 77).

"Investing could be made more efficient by undertaking vital changes early. We should have forecasted early that the product change-over would have phased out investment in business systems equipment, yet new machines

were purchased for £25,000 and were never used. Secondly, if one is in a volatile market one must be prepared for losses as there is no such thing as a captive market, not even food. Thus, one must appraise resources and utilise the plant to the fullest extent, including labour". (P62; 400; C; OMG; Business Systems; PSQ,Q76 and 77).

"Investment returns could be raised substantially by the installation of a fully automated plant, but this would not be wise in certain regions, e.g. South West, which endure seasonal and transport difficulties. Thus, investment here will continue on a piecemeal basis along with the occasional economy drive such as appraising whether the production line can be loaded more efficiently or not". (P63; 170; D; OMG; Colour Film Processing; PSQ,Q76 and 77).

"Investment performance is inhibited by the nature of the market. Demand cannot be forced, and economising merely produces marginal savings. Mass production could be attempted but this would involve a major and long term decision with financial support. In the meantime, our target return on net assets remains at 20% whilst actual returns are zero". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q76 and 77).

"Returns for 1971-73 (15.33%) have been disappointing (target 40%). However, targets have been met in the past and one must balance one period with another. Thus, no action is likely to be taken on the 25% shortfall. But greater accuracy in forecasting would obviously be helpful, together with more flexible pricing and output fixing. In fact, the recruitment of outside expertise might be a worthwhile one-off exercise to examine these possibilities". (P65; 30; B; OMG; Tents; PSQ,Q76 and 77).

It might now be helpful to turn to Table 6.19 for a summary of the above in which six basic response categories will be observed, i.e. more positive investment approach; better use of existing resources; improved marketing; government action; miscellaneous action possible but not considered; and no action possible to improve investment performances.

Table 6.19 Most Favoured Action Suggested to Improve Investment Performance. Plymouth Survey

Action:-	Employee Groups				
	0-24	25-99	100-199	200+	Totals
MORE POSITIVE INVESTMENT APPROACH					
Definite investment strategy.	4 (15%)	2 (12%)	3 (25%)	1 (11%)	10 (15%)
New plant needed.			1 (8%)		1 (1%)
Rigorous investment appraisal.	1 (4%)	1 (5%)	1 (8%)		3 (5%)
BETTER USE OF EXISTING RESOURCES					
Economies at plant level.		3 (17%)		2 (22%)	5 (8%)
Management techniques.	2 (8%)		1 (8%)	1 (11%)	4 (6%)
Full capacity working.	1 (4%)	1 (5%)			2 (3%)
Longer production runs.	2 (8%)	1 (5%)			3 (5%)
Flexible output policy.	1 (4%)	1 (5%)	1 (8%)	1 (11%)	4 (6%)
IMPROVED MARKETING					
Flexible pricing.	2 (8%)	1 (5%)		1 (11%)	4 (6%)
Market research.		1 (5%)			1 (1%)
GOVERNMENT ACTION					
Lower tax	1 (4%)	1 (5%)		1 (11%)	3 (5%)
MISC. ACTION POSSIBLE BUT NOT CONSIDERED	3 (11%)	1 (5%)	1 (8%)	1 (11%)	6 (9%)

Table 6.19 (Continued)

Action:-	Employee Groups				
	0-24	25-99	100-199	200+	Totals
NO ACTION POSSIBLE Nature of market; Trade cycles; Competition; Lack of funds, etc.	9 (35%)	5 (28%)	4 (33%)	1 (11%)	19 (29%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Questions 76 and 77

Significantly, only 20% of the sample 65 firms had considered the issues sufficiently to reach the conclusion that a more positive investment strategy, including investment appraisal, was required. An even more remarkable feature was the 29% who believed that no action could be taken to raise performance appreciably since their activities were severely constrained by such factors as external market forces, e.g. oil crises, trade cycles, competition, government policy, and the lack of finance for investment purposes. However, this feeling appeared to decline with the increased size of firm. Another statistic of interest was the 9% who having agreed that certain actions were possible to improve investment levels and subsequent returns, then stated that the likelihood of these measures actually being carried out was remote. Indeed, the whole table might be viewed in this light since although a wide range of suggestions was put forward there was, of course, no guarantee that the firms in question would implement them.

In general terms it appeared from the data collected

that there were three basic rules to be followed in order that investment performance might be improved: (i) increase the rate of investment whether it involved borrowing or not; (ii) use existing capital equipment more efficiently and intensively; and (iii) choose new investment far more carefully with the help of investment appraisal techniques.

It must be regarded as most unfortunate that government measures agreed at a N.E.D.C. meeting on 5 November 1975 would do little to assist the smaller firm with its investment problems. The scheme announced by the Chancellor of the Exchequer in the April Budget (1975) for selective assistance under the Industry Act 1972 had been sufficiently successful to justify a further extension. The object of the scheme was to encourage companies to bring forward major projects which had been planned but shelved or postponed. The build-up of interest had been encouraging with a number of companies already having been offered assistance, together with a growing number of cases under examination and new enquiries.

Three extensions of the scheme would take place: (i) the qualifying date for projects to commence under the present scheme would be extended from the end of March 1976 to the end of September 1976; (ii) the qualifying limit on the capital cost of projects (which was reduced from £2½m to £1m in September 1975) would be further reduced to £500,000 including working capital; and (iii) an additional £20m was being made available for modernisation projects (previously excluded from the scheme for the acceleration of capital projects) which met the other qualifying conditions.

In short, the revised scheme would embrace projects which satisfied the following criteria:

(i) the project should be for new investment or modernisation (or both) and the capital cost, including working capital, normally should exceed £500,000; (ii) the project should be a net addition to the firm's capital investment programme in this country, i.e. it would not take place or would be deferred but for the government's assistance; (iii) the project should be commercially sound, and lead to an improvement in the U.K. balance of payments; and (iv) construction work on the installation of plant for the project should be planned to commence before the end of September 1976, and projects which would be completed early would be given priority.

Government support under the scheme would be the minimum considered necessary. Assistance would be in the form of loans at concessionary rates of interest not greater than such available under Section 7 of the Industry Act 1972 (where appropriate an interest free period may be considered) or the equivalent in interest relief grant. The taking of equity would not be a condition of assistance. And the assistance would be available for projects throughout the country under Section 8 of the Industry Act.

It will readily be observed that the above provisions effectively exclude the small firm since its requirements would rarely, if ever, meet the £500,000 limit. It will also be recalled from the Plymouth Survey findings that small firms would appear to be in great need of investment assistance, and whilst government initiatives are to be welcomed, it is regretable that this one in particular could not be extended to cater for the not unimportant small firm sector. Indeed, this serves as a good example of well-intentioned government measures falling short of requirements as far as the small firm is concerned.

MANAGEMENT CONSULTANCY IN THE SMALL FIRM

A brief recap of the investment performance findings would show that when expected and actual rates of return were compared there were significant failures. For example, 67% of the population expected a rate of return of 20% or over, but only 47% actually achieved this. Further, no firm had expected a return of less than 10% but 32% of the sample were unable to reach this level. And 13% produced negative returns, and no firm had anticipated losses when investment had taken place. However, although 22% of the sample had expected a return of 25% or over, an impressive 31% had actually achieved this goal. This, of course, was quite consistent with the wide range of profitability recorded in other studies (31). In other words, whilst several firms had exceeded their expectations, 61% had not reached their targets. Some of these had failed to achieve even the minimum acceptable rate of return, and others had actually sustained losses. Indeed, the managerial deficiencies revealed in Chapters 2, 3, 4, and 5 appeared to be well supported by actual performances.

The reasons given by 51% of the firms for these disappointing results were claimed to be "external factors" such as inflation, competition, seasonal demand, government policy, etc. A further 26% identified the causes as "managerial problems" including forecasting, excess capacity, high overheads, material wastages, labour difficulties, and so on. But a significant pointer was that only 17% actually expressed doubts about their own "investment expertise".

A remarkable 29% of the sample felt that no action could be taken to raise performance appreciably since the external factors constraining their activities were

believed to be "uncontrollable". But even the 20% who favoured a positive investment strategy and more rigorour investment appraisal could not guarantee that such action would be implemented. Suspecting that one possible reason for this might be the lack of managerial ability in the investment field, the Plymouth Survey interviewees were asked if the firm had ever employed outside expertise, i.e. management consultancy, to assist with investment appraisal and investment decision making. Reference should now be made to Table 6.20 below.

Table 6.20 Employment of Outside Expertise for Investment Purposes. Plymouth Survey

	Employee Groups				
	0-24	25-99	100-199	200+	Totals
OUTSIDE EXPERTISE EMPLOYED BUT NOT FOR INVESTMENT PURPOSES					
Auditors	1 (4%)	1 (5%)	1 (8%)	2 (22%)	5 (8%)
Bankers	1 (4%)	2 (12%)	1 (8%)		4 (6%)
Accountants	1 (4%)	1 (5%)			2 (3%)
Sub-totals	3 (12%)	4 (22%)	2 (16%)	2 (22%)	11 (17%)
OUTSIDE EXPERTISE NOT EMPLOYED BUT:-					
Advice might be useful.	3 (12%)	2 (12%)	2 (16%)	1 (11%)	8 (12%)
Would consider employment.		1 (5%)			1 (1%)
Sub-totals	3 (12%)	3 (17%)	2 (16%)	1 (11%)	9 (13%)
OUTSIDE EXPERTISE NOT EMPLOYED OR CONSIDERED					
Not req'd by small firms	12 (46%)	6 (33%)	4 (33%)	2 (22%)	24 (37%)

Table 6.20 (Continued)

	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Unsure of value.	3 (12%)	3 (17%)	1 (8%)	1 (11%)	8 (12%)
Own experience more relevant.	3 (12%)		2 (16%)	1 (11%)	6 (9%)
Management consultants are over-rated, too expensive, invent problems for firm, disrupt work flows, represent undue external interference, etc.	2 (8%)	2 (12%)	1 (8%)	2 (22%)	7 (11%)
Sub-totals	20 (78%)	11 (62%)	8 (65%)	6 (66%)	45 (69%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 78

Table 6.20 reveals that some 17% of the 65 firm sample had resorted to outside expertise, e.g. auditors, bankers, accountants, etc., but not specifically for investment purposes. A further 13% felt that external assistance might be useful and would consider it should the occasion demand.

But 69% of the population had neither employed nor considered employing outside expertise for investment purposes, and although this finding was fairly consistent over all four sizes of firm, it did tend to predominate in the 0-24 employee group. Indeed, 46% of this particular category believed that management consultants were just not required by small firms, but this feeling declined inversely with size. An interesting feature was that although 11% had no experience of consultants, they

nevertheless considered them to be over-rated, expensive, inventors of problems, disruptive, and representative of external interference.

However, for an elaboration of Table 6.20 the following selection of extracts is presented.

"Outside expertise has never been employed specifically, but auditors have offered advice from time to time. We consider that our own experience regarding investment is far more relevant. In any event, management consultants tend to be over-rated, but presumably the good ones are competent. Nevertheless, the chances are that even these would invent non-existent problems". (Code P1; Employees 486; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 78).

"No external advice has been sought but we might be prepared to consider this. To date we have never felt the need to consult on investment or, indeed, on general operations". (P2; 95; D; FDT; Brewing; PSQ,Q78).

"Investment consultancy is not required for the type of capital spending carried out here". (P3; 50; C; FDT; Confectionery; PSQ,Q78).

"Expertise has been employed in the food division. The consultants recommended a negative investment in manpower. The labour force was pruned, and an industrial relations problem was actually created". (P4; 600; D; FDT; Baby Food; PSQ,Q78).

"No outside expertise has been sought on investment matters. None is required, but we would probably have to resort to it should a major investment programme be undertaken". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q78).

"No investment consultant could possibly read the market more expertly than we can ourselves. But advice on subsidiary matters, e.g. taxation, might be useful". (P6; 450; D; FDT; Meat; PSQ,Q78).

"Management consultants have never been considered relevant to a small firm like ourselves. No useful advice could be offered on investment since we are already at the desired level of operations". (P7; 20; C; FDT; Minerals; PSQ,Q78).

"The group has employed consultants in the past but not specifically for investment purposes". (P8; 300; C; FDT; Bread; PSQ,Q78).

"Investment consultants are not necessary in the very small concern". (P9; 15; D; CAI; Fertiliser; PSQ,Q78).

"We are not convinced of the real value of consultants. They could conceivably invent problems". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q78).

"Bankers and auditors have coped with the occasional investment problem, but we have not considered the possibilities of investment analysts". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q78).

"The firm is too small for outside consultants to be gainfully employed". (P12; 8; C; MME; Injection Moulds; PSQ,Q78).

"Outside expertise has been employed but not for investment purposes. The results of the consultancy were not too successful, and nothing was solved. Consequently, we have not considered taking advice on capital spending". (P13; 170; B; MME; Steelwork; PSQ,Q78).

"Since it is doubtful if management consultants could possibly improve investment results in machine tools, this expertise has never been sought". (P14; 468; B; MME; Machine Tools; PSQ,Q78).

"Investment consultants have not been employed. They can, apparently, disrupt the efficiency of the firm, and recommendations may be far too involved to be implemented. Generally, consultants are too expensive, and are of little value to the smaller firm". (P15; 14; B; MME; Industrial Signs; PSQ,Q78).

"We feel that we can assess our own problems better than outsiders. In any case, no advice on investment is required". (P16; 10; C; MME; Press Tools; PSQ,Q78).

"Apart from bankers, auditors, etc., no outside advice has been sought, but we might consider investment consultants if spending were to be on a major scale". (P17; 90; C; MME; Packaging Machinery; PSQ,Q78).

"Since no investment programme exists there has been no need to employ investment experts. But auditors and the banks could be approached if necessary". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q78).

"No consultants have ever been employed for investment or other purposes". (P19; 60; B; MME; Boats; PSQ,Q78).

"Investment appraisal expertise is rather less important than basic know-how which we possess and management consultants do not". (P20; 120; B; MME; Luxury Yachts; PSQ,Q78).

"No consultant could actually calculate if a unit would pay its way with a market such as ours. Basically, it is all guesswork, and we are best qualified to indulge in this". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q78).

"We have had no need for management consultants. They could leave considerable problems for the firm to solve. We know our own deficiencies already". (P22; 21; B; MME; Boats; PSQ,Q78).

"We are unsure of the value of management consultants, and would certainly avoid any degree of external interference". (P23; 50; B; MME; Iron Castings; PSQ,Q78).

"No consultant can actually guarantee successful investment, and thus their value leads to some doubt. Additionally, they do tend to be far too expensive for the small firm". (P24; 200; C; MME; Toolmaking; PSQ,Q78).

"Occasionally, the parent company has offered informal advice. Management consultants could never understand our investment problems better than we do ourselves. In any event, they are too expensive". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q78).

"We are not convinced of the real value of consultants generally. And investment levels here would not justify their employment". (P26; 70; A; MME; Trawler Repairs; PSQ,Q78).

"Consultants are not required in a firm of this size, but they might be helpful in connection with possible growth problems. Basically, investment is determined by firms' own decisions, and outside advice cannot change this". (P28; 4; B; MME; Aluminium Castings; PSQ,Q78).

"If consultants' servives were not too expensive then advice might be sought. Generally, however, we are unsure of the value of outside expertise, especially if recommendations clearly cannot be carried out owing to cost". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q78).

"Outside investment expertise would have little or no relevance to the very small firm". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q78).

"It is doubtful if management consultants could ever be helpful in a flexible market situation". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q78).

"The bank might be consulted, but generally investment would proceed as required. No outside expertise would be required for such decisions". (P33; 3; A; MME; Luxury Yachts; PSQ,Q78).

"Consultants have been employed for economies of internal staff, control of stocks, etc. But it is questionable if they could advise specifically on our specialist investment requirements, except possibly on the property side". (P34; 20; B; EE; Cold Rooms; PSQ,Q78).

"In the very small firm investment expertise would be of limited value". (P35; 20; B; EE; Electric Motors; PSQ,Q78).

"We are not against management consultants in principle but the firm must solve its own problems in the long run. No consultant could possibly improve investment decisions when the market future is unknown". (P36; 122; C; EE; Communication Equipment; PSQ,Q78).

"We have never employed or considered the employment of management consultants". (P37; 27; C; EE; Location Systems; PSQ,Q78).

"We are always willing to take advice but we have no plans to employ investment consultants. They do tend to be somewhat over-rated". (P38; 8; B; EE; Control Panels; PSQ,Q78).

"We have recruited the normal engineering consultants for the new factory in 1976-77, but outside expertise has never been employed specifically for investment purposes. The service could be over-rated". (P39; 800; D; TLCF; Footwear; PSQ,Q78).

"We are against consultants in principle". (P40; 158; B; TLCF; Clothing; PSQ,Q78).

"Management consultants have been engaged. They suggested how better labour utilisation could be achieved (at an overall cost of £20,000) to improve work flows, eliminate bottlenecks, etc. Probably the exercise was

worthwhile, but we have no plans to employ consultants for investment purposes". (P41; 150; C; TLCF; Clothing; PSQ,Q78).

"The individual firm knows best what type of investment is needed". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q78).

"We are too small a firm to warrant outside expertise, and we are unsure of the real value of such assistance. But on the other hand since we are currently sustaining losses, advice might be helpful if not too expensive". (P43; 13; C; TLCF; Wet Suits; PSQ,Q78).

"Outside expertise has been used for personnel and union problems, but never for investment decisions. Also, engineering consultants have been employed on the new building to cope with technical issues rather than financial". (P44; 45; D; BPG; Glass; PSQ,Q78).

"Consultancy would not normally be required in the very small firm". (P45; 23; C; BPG; Pottery; PSQ,Q78).

"Investment consultants have not been needed here. They could be helpful, but they could also actually create problems for the firm". (P46; 140; C; BPG; Pottery; PSQ, Q78).

"Consultants have not been used because there has been no need. We are unsure of their real value. And investment here is on an insufficient scale to warrant their employment". (P48; 25; C; OMG; Furniture; PSQ,Q78).

"The firm is too small for investment consultants to be gainfully employed". (P49; 19; B; OMG; Blinds; PSQ,Q78).

"Although we have no basic objection to investment analysts, it is most unlikely that we would ever employ them here". (P50; 44; C; OMG; Cardboard Containers; PSQ, Q78).

"Investment consultants could be helpful but we feel that the problems here are well known. Shortage of finance is the reason why the solutions have not been implemented". (P51; 3; B; OMG; Ceramic Transfers; PSQ, Q78).

"Generally, consultants would not be required, although we did take technical advice on the new build-

ing in 1971. But this was a one-off exercise". (P52; 22; D; OMG; Coffins; PSQ,Q78).

"Outside advice is not required in the very small firm where investment is unlikely to be on a large scale". (P53; 20; C; OMG; Furniture; PSQ,Q78).

"All investment here tends to be the obvious. No consultancy is required for this". (P54; 24; B; OMG; Printing; PSQ,Q78).

"Auditors and bankers were helpful with the new plant but there was no specific advice regarding the actual investment decision. The project had to go ahead irrespective of contraints". (P55; 25; A; OMG; Vehicles; PSQ,Q78).

"The firm has not employed consultants, but the industry has. Apparently, more problems were created by the recommendations. Presumably, investment experts could raise profitability but we are not prepared to take the risk as an individual firm". (P56; 50; B; OMG; Printing; PSQ,Q78).

"Outside expertise is not required for the level of investment undertaken here". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q78).

"We have no objection to consultants but they could not possibly solve our basic problems of predicting movements in the building trade and investing to cover these". (P60; 106; C; OMG; Building Materials; PSQ,Q78).

"We know that previous demand stimulates investment in the current period. No consultants are needed beyond this rule of thumb". (P61; 124; C; OMG; Joinery Tools; PSQ,Q78).

"Although our investment record is sub-standard, no investment advice has ever been sought". (P62; 400; C; OMG; Business Systems; PSQ,Q78).

"Management consultants are generally more relevant to the larger companies". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q78).

"We have employed outside expertise on a small scale. Employees gained from the recommended scheme but the firm lost financially. On balance, the exercise was really a failure". (P65; 30; B; OMG; Tents; PSQ,Q78).

Effectively, not one firm in the Plymouth Survey sample had employed investment consultants. Yet several interviewees felt able to comment adversely on the value of consultancy generally.

Indeed, the Bolton Report (32) pointed out that management consultants tended not to devote much attention to the very small firm and although the Management Consultants Association did carry out a large number of assignments for firms employing between 100 and 200 people, firms below that size very rarely employed consultants at all. It was easy to see why this was so. The profession had been growing rapidly and had maintained a high level of resource-employment by concentrating on the larger firms. There was thus little incentive to venture into the unproven and difficult field of consultancy for the very small firm. Basically, there were two serious difficulties. First, the consulting operation was not, as might be thought, necessarily more simple than advising a large firm, but in some ways more difficult. And second, the strong sales-resistance of the typical small businessman necessitated a powerful marketing effort which the majority of consultants given a high level of demand for their services were not prepared to make. It was consequently very difficult to run such services profitably.

Nevertheless, at least two consulting organisations of any size (N.U.M.A.S. Consultancy Ltd., which I.C.F.C. acquired, and I.C.F.C's own Management Services Division) had actually specialised in small firm consultancy. Moreover, bodies such as the Industrial Liaison Service, Production Engineering Advisory Service, Low-cost Automation Centres, British Productivity Council, National Council for Quality and Reliability, Manpower and Productivity Service, and the Council for Small Industries in Rural

Areas were also available.

Unfortunately, according to the Bolton Report those bodies who had attempted consultancy in the smaller firm claimed that by far the most common advanced reason for the rejection of their services was the cost. Firms maintained that fees were excessive, or that they were temporarily short of the necessary cash. But the Bolton Committee suspected that a high cost was very often advanced as a "respectable" ground for refusal by businessmen whose real objections to consultancy were unwillingness to disturb a comfortable routine and the fear, perhaps without foundation, that close investigation would reveal their own inadequacy. There was also a strong element of prejudice against "outside interference" based on the common idea that expertise in how to run a business was best gained, and most profitably exercised, by actually running one. These attitudes also prevailed, of course, in the Plymouth Survey. The Bolton Committee felt that this prejudice against management consultants among small firms was unfortunate, since most businesses would probably gain from an objective and skilled appraisal of their performance, and from the application of well tried methods to their problems.

To what extent were the Bolton Committee correct in this assessment? Were the criticisms levelled at consultants by small firms justified? Could the investment performances of the Plymouth Survey firms have been improved by outside expertise? For some possible answers to these questions, we may turn to a report published by the Department of Industry "Consultancy and the Smaller Firm" (1974) by C. D. Jones (33).

On 11 June 1968 the Board of Trade announced a scheme to encourage the wider use of consultants by small firms. It was aimed at firms with between 25 and 500

employees although it was made clear that these were not rigid limits. Any use of consultants had to be linked to the expectation of increasing the efficiency of the undertaking, (in practice "efficiency" was given a very wide definition). When consultants were used in this way, and provided prior approval had been obtained, the Board of Trade would pay half of the consultants' fees (including expenses) up to a maximum of £5,000. The scheme was closed on 28 February 1969 in that no further applications for grants were accepted after that date. However, the assignments financed under this scheme only finally came to an end during 1972.

The majority of the firms taking part (166 out of 227) were either private limited companies or subsidiaries of such companies. A further 45 firms were public limited companies or subsidiaries of such concerns. And 133 out of the 227 were firms with fewer than 200 employees. Moreover, manufacturing units had more assignments on average than did the other firms.

A breakdown of the total cost of the assignments revealed that 40% cost no more than £2,000, whilst 60% cost no more than £3,000. The total cost of the 258 assignments was £870,474 giving an average cost per assignment of £3,374. Of the assignments chosen "finance and administration" was dominant, but the extent of "investment" in this area was unfortunately not declared.

A small number of concerns had used consultants before, but those firms not having done so were asked whether there was a specific reason for this. The response given most often was that they had never felt the need to use consultants. In fact, this reason was offered in about 60% of the cases, whilst in another 18% the firms felt that consultants were too expensive. The other 22% of the reasons given were a mixed group and included such

things as opposition within the firm; put off by experiences of other firms; firms not in existance for long enough; and so on. It will be noted, again, that these were typical responses by the Plymouth Survey firms.

Importantly, firms were asked whether they were satisfied with the consultants who carried out the assignments in question. In 185 out of the 258 assignments, the firm was satisfied. In 61 cases they were partially satisfied, and in 12 cases only they were dissatisfied. Thus, in a mere 4.6% instances the consultancy did not meet the firms' expectations.

In order to check how much firms had been encouraged to use consultants they were asked if they would use consultants again. In 65 cases out of the 227 (28%) consultants had actually been used a second time. Where firms had not used consultants since the scheme ended 149 said they would, and only 10 said they would not, with the remaining 3 undecided. In other words, a remarkable 93% of the sample claimed that consultancy had been employed, or would be employed, again.

To assess the attitudes of the firms to the consultants' recommendations they were asked how many of the suggestions had been adopted. In 200 of the 258 assignments (78%) over half were adopted whilst in only 11 assignments none were implemented. On this measure, only 11 could be regarded as complete failures, whilst 200 were at least reasonably successful.

Often in consultants' reports they will make, where appropriate, an estimate of the savings or benefits likely to result from the adoption of their recommendations. In 90 assignments some assessment was given of the average benefit to the firm, i.e. £16,000 in the first year, and just over £15,000 in subsequent years. The total consultants' fees for these 90 assignments were just over

£434,000 giving an average of £4,822. Thus, if the consultants' recommendations were adopted and if the savings and benefits were achieved there would be a quantifiable non-discounted return of about 330% on the total consultants' fees for the assignments in the first year of their adoption. In actuality, the firms themselves claimed that the benefits were about two thirds of this return. This still meant, of course, that on average the total fees were recouped well within the first year. Incidentally, work done by Professor H. Johnson (34) has suggested also that average savings following a consulting assignment were equivalent to a 200% return on fees. However, it should be borne in mind that this analysis is based on averages, ignores inflation, and is non-discounted.

Thus, in summary, 95.4% of the firms in the Dept. of Industry sample were either satisfied or partially satisfied with the consultants employed; 93% claimed that they had already used, or would use, consultants again; 78% of the assignments carried out were regarded as reasonably successful by the firms; and the net benefits were estimated by the firms to be about 200% on the consultancy fees in the first year alone. In view of these findings, it must be reasonable to conclude that the Plymouth Survey firms' reservations about consultancy were probably very much over-stated, and they might well have benefited from the outside expertise they chose to reject. In short, investment optimality in particular could have been pursued rather more purposefully with the help of consultancy than without it.

SUMMARY

EXPECTED RATES OF RETURN ON INVESTMENT The policy of

rigid target return pricing, which exemplified a behaviour pattern closely approximating to satisficing, was generally employed by the Plymouth Survey firms.

MINIMUM ACCEPTABLE TARGET RATE OF RETURN ON INVESTMENT
The minimum acceptable rate of return tended to be determined by specific circumstances or events, and any apparent flexibility was directed more towards horizontal rather than vertical investment.

PROBLEMS OF PERFORMANCE MEASUREMENT The severe difficulties in measuring firms' performance or efficiency were acknowledged but since the majority of the Plymouth Survey firms expressed their profitability in terms of a "rate of return on net assets", this criterion was adopted.

EXPECTED AND ACTUAL RATES OF RETURN ON NET ASSETS COMPARED
Data were obtained from firms' annual returns at Companies House, London, and a representative 38 firm sample was devised. Published work revealed that, in the main, profitability and size of firm were independent, but in all cases the variability of profit was higher in the smaller business units. These findings were largely substantiated in the Plymouth Survey. Moreover, in the 38 firm sample (1972-74), whilst several firms had exceeded their targets, 61% had not reached their expectations, and some of these had failed to achieve even the minimum acceptable rate of return, with 13% sustaining losses. The mean expected non-real rate of return of 26.59% had suffered an actual 9.59% shortfall to 17.00%.

REASONS FOR FAILING TO REACH EXPECTED RATE OF RETURN The major reason given for the failure to reach expected

rates of return was "uncontrollable external factors". Only 17% of the firms considered that their own inadequate investment strategies, expertise, and appraisals, might have caused financial performance to be below optimum.

IMPROVEMENT OF INVESTMENT PERFORMANCE Investment by manufacturing industry as a whole between 1970 and 1975 had never exceeded the 1970 level in real terms. Only 20% of the Plymouth Survey firms felt that a more positive investment strategy was required, and 29% believed that no action could be taken to raise performance owing to outside constraints. No firm could guarantee that any suggestion put forward to improve returns would, in fact, be implemented.

MANAGEMENT CONSULTANCY A highly significant 69% of the Plymouth Survey firms had neither employed, nor had considered employing, outside expertise, believing consultants to be unnecessary, over-rated, expensive, inventors of problems, disruptive, and representative of external interference. But a Department of Industry Survey showed that of the firms in their sample, 95% were satisfied, or partially satisfied, with the consultants employed; 93% claimed that they had used, or would use, them again; and the net benefits were estimated by the firms themselves to be about 200% on the consultancy fees in the first year alone. It appeared that the Plymouth Survey firms' strong reservations about consultancy were very much overstated, and outside expertise could well have aided the pursuit of investment optimality.

REFERENCES

(1) "Small Firms", Report of the Committee of Inquiry on Small Firms, Chairman J. E. Bolton, Cmnd. 4811, Nov. 1971, p 36 and Chap. 2. Also, Economists Advisory Groups, "Financial Facilities for Small Firms", Research Report No. 4, Nov. 1971, Chap. 2.

(2) Bolton Report, p 37, as calculated from National Income and Expenditure, 1970.

(3) Bolton Report, p 37. Also, Reports on the Census of Production, 1954 and 1963, Board of Trade.

(4) Bolton Report, p 41.

(5) Bolton Report, p 42.

(6) Bolton Report, p 42, and J. G. Cox, "Scientific and Engineering Manpower and Research in Small Firms", Research Report No. 2, Nov. 1971.

(7) R. L. Hall and C. J. Hitch, "Price Theory and Business Behaviour", Oxford Economic Papers, vol. 2, May 1939, pp 12-45. A. D. H. Kaplan, J. B. Dirlam, and R. F. Lanzillotti, "Pricing in Big Business", Chap. 2, The Brookings Institution, Washington, D. C., 1958. B. H. Sord and G. A. Welsch, "Business Budgeting", New York, Controllership Foundation, 1958, pp 88-89 and 148. J. H. Miller, "A Glimpse at Practice in Calculating and Using Return on Investment", N.A.A. Bulletin, June 1969, p 73. W.W. Haynes, "Pricing Practices in Small Firms", Southern Economic Journal, Vol. 30, No. 4, April 1964, pp 315-324.

(8) A. A. Thompson, "Economics of the Firm - Theory and Practice", Prentice Hall, Englewood Cliffs, N. J., P 440.

(9) A. A. Thompson, "Economics of the Firm - Theory and Practice", p 442.

(10) A. A. Thompson, "Economics of the Firm - Theory and Practice", p 444.

(11) Taylor Nelson Investment Services, "The Why and How of Company Investment", The Director, Nov. 1970.

(12) Taylor Nelson, The Director, Nov. 1970.

(13) D. Todd, "The Relative Efficiency of Small and Large Firms", Research Report No. 18, Nov. 1971.

(14) R. Marris, "The Economic Theory of Managerial Capitalism", Macmillan, 1964.

(15) D. Todd, Research Report No. 18, p 35.

(16) M. J. Farrell, "The Measurement of Productive Efficiency", Journal of the Royal Statistical Society, Series A, 1957.

(17) J. Downie, "The Competitive Process", Duckworth, London, 1958.

(18) D. Robson, "Interpretation of Accounts with Special Reference to the Return on Capital Employed", The Accountant, 30 Sept., and 7 Oct. 1967.

(19) L. Amey, "The Efficiency of Business Enterprise", Allen, London, 1969.

(20) W. J. Baumol, "Business Behaviour, Value, and Growth", Macmillan, New York, 1959.

(21) R. L. Marris, "The Economic Theory of Managerial Capitalism", Macmillan, London, 1964.

(22) E. Penrose, "The Theory of the Growth of the Firm", Blackwell, Oxford, 1959.

(23) S. S. Alexander, "The Effect of Size of Manufacturing Corporation on the Distribution of the Rate of Return", Review of Economics and Statistics, August 1949.

(24) H. O. Stekler, "Profitability and Size of Firm", The Institute of Business and Economic Research, California Univ. 1963.

(25) M. Hall and L. W. Weiss, "Firm Size and Profitability", Review of Economics and Statistics, Aug. 1967.

(26) P. E. Hart and J. Mellors, "Profitability and Size of Firm", Univ. of Reading Dept. of Economics Discussion Paper No. 15.

(27) J. S. Samuels and D. Smyth, "Profits, Variability of Profits, and Size of Firm", Economica, May 1968.

(28) A. Singh and G. Whittington, "Growth, Profitability and Valuation", Cambridge U. P., 1968.

(29) Bolton Report, p 47.

(30) Department of Industry Survey, Jan. 1976.

(31) Bolton Report, Chap. 4. Alexander, Review of Economics and Statistics, Aug. 1949. Samuels and Smyth, Economica, May 1968. Singh and Whittington, "Growth, Profitability, and Valuation", Cambridge U. P., 1968.

(32) Bolton Report, p 122.

(33) C. D. Jones, "Consultancy in the Smaller Firm", Department of Industry, London, 1974.

(34) J. Johnston, "The Productivity of Management Consultants", Journal of the Royal Statistical Society, Series A, vol. 126, Part 2, 1963.

CHAPTER 7

INVESTMENT PERFORMANCE AND PRICING BEHAVIOUR

CHAPTER 7
INVESTMENT PERFORMANCE AND PRICING BEHAVIOUR

INTRODUCTION

A firm's attempts to attain its objective depends mainly upon its ability to assess correctly the various parameters of the market in which it operates. Above all, the firm has to decide upon the price which will hopefully optimise its profits, or sales, or return on net assets. All these results depend upon the extent to which the market responds to the price set by the firm. Nevertheless, it is surprisingly not necessarily true to claim that in practice its pricing policy is a matter of the greatest concern to a firm. This is supported, for example, by the Udell Study (1). It concluded that business management did not agree with the economic views of the importance of pricing as one half of the respondents did not select pricing as one of the five most important policy areas in the firm's marketing success. Further, the pursuit of certain objectives does require that prices be set according to some formula which relieves management of the need to adopt discretionary pricing policies. In some industries competition is on a non-price basis, with the stress laid instead upon quality or service. Where this holds true, pricing decisions will be treated as routine adjustments based upon general industry movements. This is not, however, to suggest that a firm will be better off were it to cease to employ

some form of pricing policy. There are many situations in which pricing decisions will require considerable skill and expertise, and any firm which seeks to optimise returns on net assets must constantly vary prices in line with changes in demand. Where firms compete closely with one another, especially where they are tending for contracts, pricing rules will not prove satisfactory. Not least, careful pricing will also be a question of survival for many small firms (2).

To what extent were the investment performances of the Plymouth Survey firms affected by their pricing behaviour? How was price actually calculated? Which factors merely influenced price as opposed to determining it? What percentage profit margin was normally required? Was this percentage rigid or variable? What minimum percentage profit margin would be acceptable? Could an assessment be made of the shape of the average cost curve for the main product? Could the demand curve be estimated? And what would be the likely response of demand to flexible pricing policies? The aim of Chapter 7 is to consider these and related points.

SOME PREVIOUS PRICING STUDIES

Curwen (3) suggests that there is not much available evidence on how firms actually price in practice. This is not too surprising in view of the continued popularity of the use of traditional models of the firm which postulate that price is based upon the equating of marginal cost and marginal revenue. However, although the question was not specifically put to the Plymouth Survey interviewees, the inference was that they were unaware of the profit maximising MC = MR rule. And even if the rule

could be applied in the real world on a day to day basis, and it cannot, the obvious must be stated that there was certainly no evidence of Plymouth firms aiming for, or achieving, profit optimisation by this method even in the long run. Indeed, several firms were unable to pinpoint exactly how they went about setting prices.

Hall and Hitch (4) pointed out that most of their informants were vague about anything so precise as elasticity. Further, many made no effort even to estimate elasticities of demand. And of those who did the majority considered the information of little or no relevance to the pricing process, except perhaps in particular circumstances. Hall and Hitch's work was one of a number which set out specifically to refute the axioms of marginal analysis, and was largely paralleled by Sweezy (5). Hall and Hitch claimed that firms relied mostly upon some variant of full cost pricing, although unlike the Plymouth Survey findings, they believed that in the long run this would produce profits approximating to maximum. Occasionally, entrepreneurs amended their prices when demand altered, but in the main, prices were kept constant implying flexible mark-ups on cost. In any event, rigid prices do require an element of collusion.

As indicated in Chapter 1, attempts were made to refute the conclusions of Hall and Hitch; the best known criticism being, perhaps, that of Earley (6). Earley inferred from indirect evidence that marginalism among companies was strong. His conclusions were that short views, innovative sensitivity, marginal costing, and marginal pricing were all preponderant among the responding companies. Secondly, where considerable segmented variable cost data were brought to managements' attention, the companies' short-range policies were consistent with their longer-range costing, pricing, and other product

related policies. And finally, that with such companies marginalism was apparently not dependent upon a short time perspective.

Hague (7) however, pointed out that the results of that kind of study depended too much on inferences and implication read into personal opinions expressed verbally by businessmen, and too little on authentic written statements and statistical data. But this objection could be levelled at his own study in which Hague interviewed eight large and twelve small firms in the Midlands. He found that the firms were less interested in profit maximisation than in a comfortable and secure income. Two distinct types of output policy were found. In small firms output was rarely fixed so as to equate MC and MR, but by rule of thumb methods. (Indeed, this is confirmed in the Plymouth Survey, and is developed in Chapter 8). In large firms, on the other hand, there was greater desire to earn maximum profits, but again, there was no attempt at careful balancing of MC and MR. In general, these firms seemed to be satisfied that long run profits were maximised, but they had no scientific policy for ensuring this. Where there was no conventional or controlled price for the product, Hague's firms based price upon what appeared in general to be the accountant's estimate of total unit cost (which was similar to the Hall and Hitch conception of full cost) to which was added a profit margin based largely on convention.

Skinner (8) sent out a questionnaire to members of the Merseyside Chamber of Commerce in 1968. His main conclusion was that although 70% of the respondents in the survey claimed to use cost plus pricing, prices were very much influenced by competition and demand. In his study, Skinner asked firms if they divided their costs into fixed and variable, and if so whether this provided

the basis for price setting. Some 73% claimed to make the distinction, and 69% said they used it for pricing. Skinner then argued, much as did Earley (9) that a firm which made that distinction was employing variable (or marginal) costing. Sizer (10) however, thought that a more reasonable interpretation of Skinner's work might be that firms analysed costs into fixed and variable elements as part of the procedure for establishing overhead recovery rates and mark-up on cost percentages.

A brief summary of other studies can be found in Silbertson (11). He concluded that full cost was a well established method, but there were many marginalist and behavioural qualifications. It seemed clear that the procedure of calculating prices very often started with an average cost, but the qualifications that arose were concerned with the next stage of the process, including the exact method by which full costs were calculated. Perhaps an important point to bear in mind is that the studies mentioned above concentrate mainly on home market prices, and there is some evidence that in export pricing marginal calculations figure much more prominently.

Attempts have occasionally been made, invariably in the U.S.A., to specifically collect information on pricing policies to produce more extensive and useful information than the above. This has been done for example, both for large (12) and small (13) firms. However, the general feeling on reviewing the various published studies is one of uncertainty regarding pricing in the real world situation of the smaller firm. Contributors have produced differing results over the years. Recapping, Hall and Hitch (14) found that firms were vague about the mechanics of marginalism to achieve profit optimisation, and relied instead upon full cost pricing. These findings were largely paralleled by Sweezy (15). Earley (16)

however, suggested that marginalism was strongly implanted in pricing behaviour. Hague (17) reported that firms were less interested in profit maximisation than in secure income, and in any event, the application of the MC = MR rule was not apparent. Firms based price upon total cost, not unlike the Hall and Hitch conception. Skinner (18) concluded that cost plus pricing was very much influenced by competition and demand. And firms making the distinction between fixed and variable costs were, in essence, employing variable or marginal costing. But Sizer (19) rejected Skinner's interpretation of the latter. Finally, Silbertson (20) felt that full cost pricing was well established but there were many marginalist and behavioural qualifications. Not surprisingly, Curwen (21) considered that the evidence on pricing was somewhat inadequate.

Consequently, how did the Plymouth Survey firms actually calculate price? What were the main determinants? Which factors merely influenced price? Assuming that output levels were pre-determined, a firm intent on optimising its rate of return on investment, would presumably aim for the highest possible price at that production level. Incidentally, the assumption of "fixed" output levels is well founded as far as the Plymouth Survey is concerned, since it will be demonstrated in Chapter 8 that hardly any firm systematically amended production levels in order to increase profit, i.e. increase or decrease production to approximate to the MC = MR output point. If it could be shown that firms did not employ flexible pricing at all, i.e. charging the optimum price in response to market conditions, then the adverse returns on net assets reported in Chapter 6 would be explained in this instance in terms of inadequate pricing behaviour.

PRICE DETERMINANTS

On the available evidence, Hawkins (22) believes that the most empirically supported theory of pricing is the cost plus approach. There are, in fact, many cost plus theories, but they have, in the main, a common basis. Firms in the Plymouth Survey using this method simply set price by estimating production costs and adding on a percentage mark-up for profit. But it is known that certain firms add the mark-up to variable costs, others to fixed costs or total costs, whilst some add it to various accountancy definitions of cost which do not convert directly to the economist's treatments of the subject. However, the methods are essentially similar though the cost base may vary. If the cost element is small the mark-up is large and vice versa. There are are almost as many names for cost plus pricing as there are methods of carrying it out. The main alternatives used are full cost or cost plus; mark-up; and administered or target pricing. The extent of adoption of the cost plus percentage, for example, by the Plymouth Survey firms is presented in Table 7.1.

Table 7.1 Most Dominant Price Determinants on Batch and Routine Production. Plymouth Survey

Determinants	Employee Groups									
	0-24		25-99		100-199		200+		Totals	
COST+PRICING										
Full costs	13	(50%)	8	(44%)	6	(50%)	4	(44%)	31	(48%)
Labour	2	(8%)	3	(17%)	1	(8%)	2	(22%)	8	(12%)
Materials	1	(4%)	2	(12%)	1	(8%)	1	(11%)	5	(8%)
Fixed costs	1	(4%)			1	(8%)			2	(3%)
Variable costs	1	(4%)							1	(1%)
Hourly running rate	2	(8%)	1	(5%)					3	(5%)

Table 7.1 (Continued)

Determinants	Employee Groups 0-24	25-99	100-199	200+	Totals
Design, research, floor space costs, etc.	1 (4%)	1 (5%)			2 (3%)
Price stability	1 (4%)	1 (5%)			2 (3%)
Misc. A/cg. concepts	1 (4%)		1 (8%)		2 (3%)
Sub-totals:	23 (88%)	16 (88%)	10 (83%)	7 (78%)	56 (86%)
NON-COST PRICING					
Rival prices	1 (4%)		1 (8%)	1 (11%)	3 (5%)
Market prices	2 (8%)	2 (12%)	1 (8%)	1 (11%)	6 (9%)
Sub-totals:	3 (12%)	2 (12%)	2 (16%)	2 (22%)	9 (14%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 79

Whilst it was true that all firms were basically conscious of cost and made this the essence of price calculation, 14% of the sample, with the larger firms predominating slightly, claimed that non-cost pricing was also practised. Costs had to be covered in the first instance, but the ultimate selling price would be determined by what the market would bear at the output level in question, or the price set by competitors. Where this ultimate price exceeded cost it would be applied over the longer run; where it fell below cost it would be regarded as a short term venture only. This, of course, was indicative of flexible mark-ups. The impact of rival prices was surprisingly not strong. Competition was certainly acknowledged by the firms but rarely did a rival price actually determine the price for the firm in question. In fact,

the prices of only 5% of the population were determined in this way. This is not to say, of course, that firms were not influenced by external factors. Under certain conditions, e.g. falling sales, they would be. The issue under consideration here is price determinants rather than price influences.

The most striking characteristic of the table was the significant majority who firmly based price on cost. Almost half of the firms (48%) set price by estimating full costs and adding their percentage mark-ups in the Hall and Hitch, Sweezy, and Hague traditions. The Silbertson view of C+% was also confirmed, but there was little evidence of price's being determined by "marginalist and behavioural qualifications", or by the "strong marginalism" forwarded by Earley. And the "rivalry and demand" determinants as suggested by Skinner were, as already indicated, somewhat weak. In addition to the 48% a further 38% of the sample, whilst adopting the C+% method, nevertheless used an aspect of cost as the main determinant such as labour, materials, fixed costs, variable costs, hourly running rates, and so on. Labour costs, for example, were obviously of some importance. All four groups of firms referred to this factor as a determinant, but only 12% gave it top priority in Table 7.1. And only 8% felt that material costs provided the basis for price. Perhaps a surprising omission was expected costs. Interviewees almost constantly complained of inflating costs of production, but it seemed that in the light of the other issues, expected costs were rated low as a price determinant.

In total, some 86% of the firms employed a cost based price and this finding was evenly spread over all four sizes of firm. However, in order to present these statistics more individually, it might now be timely to

examine some specific conceptions of price determination.

"Price is based on full cost plus 7% to 8% with the emphasis on labour. Estimating is carried out in a similar manner". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 79).

"The price payable by the market at any given time is known, and price is adjusted for this, if necessary, after costs have been compiled". (P2; 95; D; FDT; Brewing; PSQ,Q79).

"Costs are assessed and a 13% mark-up is then added. This is then adjusted by a market percentage to produce the selling price over the longer term". (P3; 50; C; FDT; Confectionery; PSQ,Q79).

"We use the C+% method of pricing with different % mark-ups for different products to produce the required profit. If this profit is not achieved then the % is amended accordingly from time to time". (P4; 600; D; FDT; Baby Food; PSQ,Q79).

"Price is determined by the brand leader's price minus a small % provided that our fixed costs do not exceed this figure, i.e. cost + 8%". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q79).

"Price is built up from overheads (2% to 7%) labour (2% to 7%) and materials (85% to 95%). A variable gross margin, found to be adequate and sufficient by weekly analysis of our profit and the price the market will bear is then added. But we do not actually initiate price". (P6; 450; D; FDT; Meat; PSQ,Q79).

"Our price, which is determined by C+20% undercuts the larger firms, and this is confirmed by our printed price lists". (P7; 20; C; FDT; Minerals; PSQ,Q79).

"We adopt the C+7½% method but the resultant price is then reduced by the current government subsidy on bread. The price of a standard loaf would be 17p (1975) should the subsidy be removed". (P8; 300; C; FDT; Bread; PSQ, Q79).

"Price tends to be industry dominated after total costs have been covered as a first principle. The standard mark-up is 15% on average". (P9; 15; D; CAI; Fertiliser; PSQ,Q79).

"We use the total cost + 25% system and have always done so in pricing our products". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q79).

"Price has traditionally been determined by the accounting device of material target cost + 0.45 less labour and overheads giving a 22% mark-up in essence". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q79).

"Estimates are usually calculated on an enhanced hourly running rate basis, whilst batch and routine prices are determined by materials + hourly running rate + packaging + delivery + 15% to 20% mark-up depending on the item in question". (P12; 8; C; MME; Injection Moulds; PSQ,Q79).

"On tendering, for example, price = cost + 14% which is then adjusted subject to market conditions long run. One is never sure whether the tendered price is the optimum and this must affect profitability. Estimates tend to be influenced by the length of time allowed for the quotation. If only a short period is available, then the price would be guesstimated". (P13; 170; B; MME; Steelwork; PSQ,Q79).

"Price has always been determined by cost + 10% to 20%. Estimates tend to be produced by calculating variable costs and adding the required contribution to overheads". (P14; 468; B; MME; Machine Tools; PSQ,Q79).

"Production generally consists of small batches together with some one-off work. Price depends upon costs + 20% provided that this is below that charged by competitors, and it usually is. If a contract involves a relatively large volume of work then the mark-up can be lower than 20% in the first instance. In any event, once a contract has been obtained at a price acceptable to the buyer, then corners are cut in an attempt to achieve the target profit. Prices, however, have been fairly stable over periods of time". (P15; 14; B; MME; Industrial Signs; PSQ,Q79).

"The price that the market will bear is not usually taken into account but costs of production are fundamental + an average 15% mark-up. Quoted estimates are simply rough approximations based on general experience and memory". (P16; 10; C; MME; Press Tools; PSQ,Q79).

"Price is fixed initially by what the market will bear, and is then checked against costs. If the former exceeds the latter then the contract proceeds". (P17; 90; C; MME; Packaging Machinery; PSQ,Q79).

"Boats are priced on a cost + 25% basis producing standard prices, e.g. £8,000, which are maintained over the medium term". (P18; 12; A; MME; Ocean Cruisers; PSQ, Q79).

"Price is basically market determined after labour, materials, overheads, and a 40% to 60% mark-up has been covered for each particular line". (P19; 60; B; MME; Boats; PSQ,Q79).

"Boat footage is the yardstick for price, e.g. 32ft @ £234 per foot. Price is finalised by a direct cost + overheads + 19% inflation + mark-up formula". (P20; 120; B; MME; Luxury Boats; PSQ,Q79).

"We have no official costing system. All work is one-off and labour time is the crucial factor in the determination of price with equally important adjustments for materials and what the market will pay for each individual contract. Incidentally, it is known that rivals simply charge 66% of the price to replace the old vessel. Our pricing is more flexible". (P21; 1; A; MME; Repairs Cylinder Blocks; PSQ,Q79).

"Price is determined by C+20% for batch and routine work". (P22; 21; B; MME; Boats; PSQ,Q79).

"A variable mark-up (average 15%) is added to full cost to produce the selling price. The time factor is a critical constituent of this calculation". (P23; 50; B; MME; Iron Castings; PSQ,Q79).

"A standard cost technique derived historically forms the basis of price with up to 30% added for profit". (P24; 200; C; MME; Toolmaking; PSQ,Q79).

"All production is one-off and price is based upon total costs, e.g. materials, setting up costs, overheads, research, testing, etc., with a 20% mark-up added. Labour, however, is the most significant factor". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q79).

"Costs have to be covered as a first priority. Then a 10% to 20% mark-up is added depending on the product. Estimates are geared more to basic know-how rather than formula". (P26; 70; A; MME; Trawler Repairs; PSQ,Q79).

"Pricing depends upon total costs, which in turn are influenced by batch sizes, etc". (P27; 40; D; MME; Thermowells; PSQ,Q79).

"Full costs of production are estimated and a 10% to 20% mark-up completes the price calculation for individual items". (P28; 4; B; MME; Aluminium Castings; PSQ, Q79).

"The parent company has occasionally determined price but even so, costs had to be covered with a 12½% to 15% profit margin added". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q79).

"Price is made up from labour 30%, materials 20%, overheads 20%, and profit 30%. Estimates are calculated mainly on a time basis, e.g. materials + 25% labour X 300% = price". (P30; 30; B; MME; Ford Pentrol Engine Conversions; PSQ,Q79).

"The C+% method is adopted. Overheads are 250% of direct labour which is equivalent to approximately 20% of the final selling price. Alternatively, price may be calculated by labour 20%, overheads 50%, materials 20%, and profit 10%". (P31; 50; B; MME; Steelwork; PSQ,Q79).

"A labour hourly rate and a materials % are estimated for each individual one-off item. A profit margin of up to 15% is then added to determine a unique price for the customer". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q79).

"Cost plus a variable % (10% to 40%) forms the basis of price. The flexible mark-up depends entirely upon the customer and the importance of the order. Most work is of the one-off type and thus all jobs are costed individually usually on a footage basis in the first instance". (P33; 3; A; MME; Luxury Yachts; PSQ,Q79).

"Costs form the basis of price but a transport adjustment is made if Cornwall is involved in deliveries. A profit margin of 25% to 33% is added depending on the nature of the work, e.g. industrial or domestic". (P34; 20; B; EE; Cold Rooms; PSQ,Q79).

"Labour time, overheads, materials, plus a 25% profit margin determine the price of individual products". (P35; 20; B; EE; Electric Motors; PSQ,Q79).

"Price is calculated by the cost + 20% method. Once the price has been agreed, it remains settled as a policy". (P39; 800; D; TLCF; Footwear; PSQ,Q79).

"Materials 50%, labour 25%, overheads 25%, and profit (basically market determined) 7% make up the selling price". (P40; 158; B; TLCF; Clothing; PSQ,Q79).

"We adopt a standard cost system of pricing, i.e. materials 50%, labour 25%, overheads 25%, comprise the cost of production. The profit margin tends to be variable in that it is occasionally determined by important customers. Materials are by far the most expensive item in the costing process". (P41; 150; C; TLCF; Clothing; PSQ,Q79).

"Since we are engaged on contracts for naval uniforms, the government determines our prices (and survival) in the long run. But fundamentally, price is based on cost of production which in the past has been below that which the customer has been willing to pay. A 15% profit margin has been considered a fair return in the past and this has been maintained". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q79).

"Labour and material costs are estimated and 45% to 60% is added for overheads. Finally, a 12% profit mark-up completes the price charged. However, large batches have occasionally deflated this price in the past". (P43; 13; C; TLCF; Wet Suits; PSQ,Q79).

"Glass is traditionally priced on a square footage basis, which takes into account full costs of production plus 10% to 15% for profit. But building industry trade cycling can affect this price from time to time". (P44; 45; D; BPG; Glass; PSQ,Q79).

"Price is normally kept as stable as possible by means of a flexible profit margin of up to 20%. This policy has been maintained despite the seasonal trade cycle in pottery". (P45; 23; C; BPG; Pottery; PSQ,Q79).

"Basically, price is determined by the C+% method. Currently, the profit mark-up stands at 6% but in the longer term the market fixes the price". (P46; 140; C; BPG; Pottery; PSQ,Q79).

"A 10% profit mark-up is added to the cost of materials, labour, and overheads, but this price can be affected on occasions by such factors as rival prices, V.A.T. on blinds, and the number of designs required by the customer". (P49; 19; B; OMG; Blinds; PSQ,Q79).

"Price is determined by a series of factors, e.g. sheet size, the number required, material cost, labour hours, and a 15% profit mark-up". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q79).

"The market determines the price since we cannot change what the customer will ultimately pay. But basic price is derived from a C+% approach with some averaging otherwise many calculations would be needed. Estimates are prepared in respect of the product area, number of colours required, etc". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q79).

"Labour 12%, materials 48%, overheads 25%, and a profit margin of 15% constitute price. Alternatively, raw material cost, a 50% wastage allowance, labour at 0.024p per minute, and a 50% uplift are employed for estimates". (P52; 22; D; OMG; Coffins; PSQ,Q79).

"Pricing is unique. For example, composition, binding, materials, outwork, number of words, felting, lettering, gluing, printing, stitching, and particularly rival prices, plus 10% to 33⅓% profit are all relevant variables". (P54; 24; B; OMG; Printing; PSQ,Q79).

"All work is of the one-off type and labour cost plus 120% (which is a variable according to what the market will pay) has been our traditional method of pricing". (P55; 25; A; OMG; Vehicles; PSQ,Q79).

"Floor space and labour are important cost factors in the calculation of price. But in essence, it is a cost + variable % approach". (P56; 50; B; OMG; Printing; PSQ,Q79).

"Cost of production plus a 20% to 30% profit margin plus a further percentage in respect of certain batches and what the customer is likely to agree to pay in the light of rival prices". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q79).

"Since we are engaged entirely in one-off production, marginal costing forms the basis of all pricing". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q79).

"Price consists of costs plus 10% or less depending on rivals, size of potential contract, etc". (P59; 175; D; OMG; Concrete; PSQ,Q79).

"In the building trade price is usually determined by costs plus a profit % and what the market will actually pay as a result of the inevitable trade cycling". (P60; 106; C; OMG; Building Materials; PSQ,Q79).

"Costs must be covered as a first principle of pricing. Then 10% is added. Unfortunately, current inflation can hinder the whole approach". (P61; 124; C; OMG; Joinery Tools; PSQ,Q79).

"Pricing is based on a break even test with a standard cost, and inflation %, and a 15% profit margin added. An adjustment in respect of rival prices, etc., is implemented as necessary". (P62; 400; C; OMG; Business Systems; PSQ,Q79).

"Although pricing can be individual, e.g. in respect of design difficulties, numbers involved, etc., most calculations take the form of a floor space cost plus a 250% margin for overheads, and a 10% to 30% profit mark up". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q79).

"We adopted a stable prices policy several years ago. Prices are usually held constant for 12 months and then reviewed. Unit cost is known from experience and a fixed 40% is added to this". (P65; 30; B; OMG; Tents; PSQ,Q79).

The extracts do tend to support the various contributors who have claimed that pricing is dominated by the C+% method. No firm in the Plymouth Survey fixed price by the MC = MR rule and only 9 (14%) concerns actually paid attention to rival prices and what the customer was likely to agree to pay over the short run. Mark-up pricing was common (including the 9 price initiators referred to above) although sometimes different margins were applied to different products. However, whether these mark-ups were fixed or flexible, and the latter was mainly the case, the end result tended to be short run price "stability" in the main. It could well be argued, of course, that price leaderships by certain large firms reduced many of the small firms in question to price takers, but even so, some concerns at least, could and should have

employed a little more flexibility in their pricing if returns were to be optimised. Certain firms were heavily entrenched in price conservatism, e.g. stable prices irrespective of market trends. And, as in the Udell (23) study they clearly felt that pricing was not necessarily a top priority for successful operation. In any event, since internal information on costs, and market research on demand, were somewhat inadequate, firms found it virtually impossible to apply profit optimising pricing rules. Additionally, the impression was that few firms in the Plymouth Survey considered that profits could be raised significantly simply by adopting flexible pricing. Some doubted if flexibility could, in fact, be implemented at all. But most firms would be able to employ some measure of flexibility, e.g. by discount manipulation. In the absence of economic pricing, profitability was bound to be severely affected to the extent, for example, that 61% of the firms failed to reach their target returns on capital (refer Chapter 6). At best, satisficing profit could only be expected.

Further examples of the widespread adoption of C+%, mark-up pricing, price stability, absence of marginalism, etc., can be found in the 1971 Greater Manchester Study (24).

"Standard costings exist for each of our lyd^2 tiles. Labour 46%, materials 36%, overheads 18%, and profit 14%, make up the basic price. If the quantities involved are large then price can be varied by means of discounts". (Code GM3; Employees 200; S.I.C CAI; Main Activity P.V.C. Floorings; Source Greater Manchester Study, Questions 16, 17 and 18).

"Prices are determined on a total cost plus profit basis. The mark-up on each product is not uniform since it is to some extent dependent upon efficiency changes within the firm, state of the market, and fluctuations in the prices of raw materials". (GMS6; 24; CAI; Alkyd Resins; GMS,Q16, 17 and 18).

"Price is based on total costs plus profit. If the market will not bear the price resulting from this calculation over the long run, then the product range has to be reviewed and rationalised as necessary, or value engineering introduced, to minimise wages and material costs". (GM12; 54; MME; Searchlights; GMS,Q16, 17 and 18).

"Overheads are known to be £10,000 per week. Production labour costs £5,000 per week. Hence recovery or contribution per £1 of direct labour must average £2 plus". (GM19; 175; MME; Marine Products; GMS,Q16, 17 and 18).

"Our method of pricing is basically C+%, i.e. estimated materials plus a standard factor for the time involved". (GM20; 5; MME; General Engineering; GMS,Q16, 17 and 18).

"Price is determined by materials 58%, oncost 10%, labour 32%, and profit 19%". (GM26; 15; TLCF; Foam Fabrics; GMS,Q16, 17 and 18).

"The constituents of price per yard of fabric include weaving cost 40p, dyeing 4p, finishing 3p, other processes 3p, carriage outwards 5p, labour 45p, and profit mark-up 18p". (GM30; 24; TLCF; Furnishing Fabrics; GMS,Q16, 17 and 18).

"All our work is contracted and each job is priced individually (some of it at cost) depending on estimates of likely profits, sales, etc". (GM34; 200; OMG; Laboratory Furniture; GMS,Q16, 17 and 18).

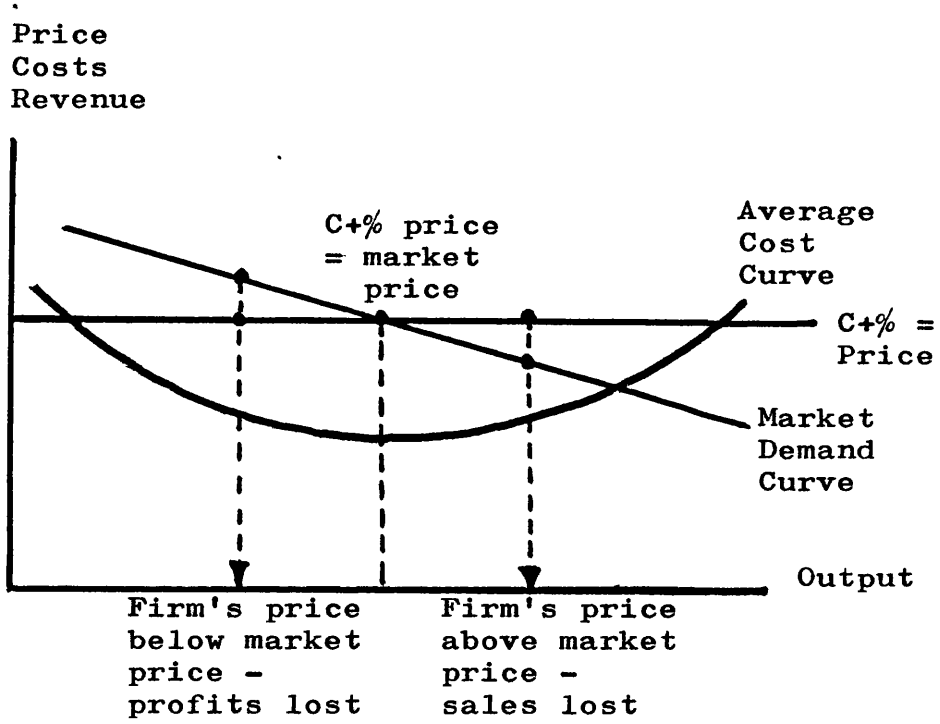
Again, price was linked closely with cost containing suggestions of price rigidity over the short run. Only 1 firm in the respresentative batch emerged as a price initiator (GM34) and, in fact, produced a 23% rate of return on net assets for the period under review. However, it must also be pointed out that the other firms above similarly recorded satisfactory returns, if not necesarily optimum ones.

It would seem remarkable that the majority of firms should opt for the C+% method of pricing when its limit-

ations are fairly obvious.

Firstly, the C+% method effectively ignores market conditions and profits or sales could be forfeited as shown in Fig. 7.1.

Fig. 7.1 Limitations of Cost Plus Pricing



Source: Plymouth Survey Questionnaires;
Questions 79 to 88

Incidentally, Fig. 7.1 goes no small way in dispelling the notion of profit maximisation in the real world. If a firm set its price by the C+% method and this, by accident, equated with the market price both short and long run, then profit would indeed be maximised at that particular output level. However, if price were set below that which the market was prepared to pay (and this appears to be likely from the implications of the "Z-shaped" demand curve as per Figs. 7.15 to 7.22) then obviously any profit made would be below maximum. If

the firm, in an attempt to maximise profits long run, then set C+% above market price, sales would be reduced and profit would, again, be below maximum. The outcome of this is clear. Any profit lost in the short run can never be regained over the longer period. The "Z-shaped" demand curve, together with the lack of information problem, render profit maximisation virtually impossible. Secondly, C+% assumes accurate calculations of cost, and this might not be the case. And thirdly, the price fixed by C+% is far too rigid, as already pointed out, and very rapidly becomes out of date in relation to market trends.

On the other hand, however, supporters of C+% could claim that the method does produce a "fair price" which many businessmen would favour. It is certainly simple to understand, and this is likely to appeal to both manufacturer and customer, e.g. where estimates are concerned. Strangely, economists might even be able to justify the method on the grounds that C+% could produce optimum profits over the longer term by trial and error means. In other words, if the price is adjusted occasionally in order to rectify shortfalls then target profit could well be reached in time. Finally, C+% does tend to lead to market confidence if prices are fairly stable.

Nevertheless, if firms wish to raise their investment returns via pricing, then some short run flexibility of price would be recommended.

Specifically, it might be recalled that in the abridged 38 firm sample used in Chapter 6 for a comparison of expected and actual rates of return on investment, only 15 firms (39%) successfully reached their targets. In the 65 firm sample, 9 companies employed short run flexible pricing, and 8 of these were also part of the abridged sample. An examination of these 8 price init-

iators (P19; P21; P32; P54; P55; P57; P58; and P62) revealed that 7 of them (87%) achieved their target rates of return, whilst the degree of success for the firms employing "rigid" pricing methods was considerably lower.

Table 7.2 Achievement of Target Rate of Return on Net Assets and Flexible Pricing. Plymouth Survey

Target Rate of Return Result:-	Short Run Flexible Pricing	Short Run Rigid Pricing	Totals
Success	7*(87%)	8 (26%)	15 (39%)
Failure	1 (13%)	22 (73%)	23 (61%)
Totals:-	8	30	38

Source: Plymouth Survey Questionnaires; 38 Firm Sample (72-74); Questions 71, 72 and 79
Companies House, Annual Returns, London

Table 7.3 Analysis of the 7 Successful Price Initiators* by Production Run Category and Size of Firm. Plymouth Survey

Production Run Categories

"A"	"B"	"C"	"D"	Total
4 (57%)	2 (28%)	1 (14%)	-	7

Employee Groups

0-24	25-99	100-199	200+	Total
3 (42%)	2 (28%)	1 (14%)	1 (14%)	7

Source: Plymouth Survey Questionnaires; 38 Firm Sample (72-74); Question 79
Companies House, Annual Returns, London

Whilst the above results give the impression of being fairly clear cut, i.e. the most successful firm being the price initiator engaged in specialist one-off work, and employing between 0-24 staff, it would be most unwise to draw firm conculsions from the tables since the results, although factual, may be accidental. But the data are

interesting and could provide an area for further and more incisive research.

What has emerged from this brief examination of price determinants may be effectively summarised by the Haynes (25) investigation in the U.S.A. Haynes researched 88 small firms in the manufacturing, retailing, and service sectors employing for the most part fewer than 200 employees. His conclusions, which will be noted correlate favourably with the observations made in respect of the Plymouth Survey, were as follows. Prices were more often based upon costs rather than upon demand. Mark-up pricing was common. Mark-ups were set at different levels for different products. Price leadership by large firms made many small firms price followers. And information for the application of economic pricing was poor.

PRICE INFLUENCES

According to traditional theories of competitive behaviour firms do not have flexible pricing policies either. The perfectly competitive firm is at all times a price-taker, and even the monopolist, once he has selected that price which will maximise profits in the short term has no need to take any further action with respect to price because it is assumed that the firm's cost and revenue conditions do not alter in the long run, all potential competitors being excluded from the industry.

But in practice, no matter what the competitive nature of any market, one would expect both cost and demand conditions to change either gradually or markedly over the life span of a product. The parameters of demand, such as incomes and tastes, are not constant, nor are the

parameters of cost such as factor prices and technical efficiency. In a dynamic world therefore, one would expect a firm's pricing policy to be adaptive over the longer term. In other words, if the price were adjusted over time in order to rectify profit shortfalls, then this might, at least, indicate a degree of "flexibility" in the pursuit of target rates of return on net assets. In an attempt to research this (and it is notable that the literature in the main excludes this important distinction) the Plymouth Survey interviewees were asked to specify those factors which had influenced price periodically, as opposed to short run determinants.

"Most of our commitments are repeat orders and consequently we tend not to pursue new contracts which might provide the means for more flexible pricing". (Code P1; Employees 486; Production Run Category C; S.I.C. FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 81).

"Prices are fixed by C+% but they could be amended if rivals, for example, were able to offer a more efficient delivery, and held prices constant during periods of inflation". (P2; 95; D; FDT; Brewing; PSQ,Q81).

"Factors which have influenced prices beyond our control have been government price restrictions, and what the market will ultimately pay from time to time". (P3; 50; C; FDT; Confectionery; PSQ,Q81).

"Severe rivalry could cause us to reconsider our price fixing and especially if demand moved into new lines not manufactured by ourselves. In the absence of this, price tends to be automatic, although more competition is developing". (P4; 600; D; FDT; Baby Food; PSQ,Q81).

"The brand leader's price is perhaps the most significant single influence on our price, although currently we are actually ignoring this in an attempt to cover losses". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q81).

"Even over the longer term costs must be covered, but the basic market price for meat and rival prices have been equally relevant in the fixing of basic price here". (P6; 450; D; FDT; Meat; PSQ,Q81).

"We have never adopted a policy of charging what the market will bear although rival prices have been noted in the past". (P7; 20; C; FDT; Minerals; PSQ,Q81).

"It is known that the public taste for bread has changed, and is still changing, to the extent of a 2% fall in demand per year. Currently, we estimate that consumption is down to 28 ozs per person per week, and price cannot fail to be influenced by this in the end". (P8; 300; C; FDT; Bread; PSQ,Q81).

"Price is industry led but rising wage bills and other inflationary costs are becoming more and more influential in the fixing of price". (P9; 15; D; CAI; Fertiliser; PSQ,Q81).

"Rivalry is apparent in the market but this has had only a marginal effect on pricing here". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q81).

"Although costs actually determine price, competition, market trends, government freezes, etc., have all had some effect long term". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q81).

"Over a period of time competition, inflation, and expected demand have caused prices here to be other than those determined initially by materials, hourly running rates, packaging, delivery, and profit mark-up". (P12; 8; C; MME; Injection Moulds; PSQ,Q81).

"Costs determine price but what the market will pay at given levels of output can also be a relevant factor. Rival prices too may sometimes have to be considered". (P13; 170; B; MME; Steelwork; PSQ,Q81).

"Pricing can be affected by market trends and competitors. However, since we are currently making only a nominal return on net assets (3.69%) price cannot be reduced. And if price were raised, competitors would take advantage eventually". (P14; 468; B; MME; Machine Tools; PSQ,Q81).

"Occasionally, rival prices might be consulted with the objective of undercutting. It is vital that certain important orders be secured and then economies can be made to raise ultimate profit". (P15; 14; B; MME; Industrial Signs; PSQ,Q81).

"The practice of charging what the market will bear has never been employed as a policy. But the size of the order, the type of customer involved, etc., can sometimes be taken into account. For example, if follow up contracts were likely, then price could be reduced slightly". (P16; 10; C; MME; Press Tools; PSQ,Q81).

"If rivalry and market trends have influenced our prices, the effect has merely been marginal. Costs are the fundamental determinants of price". (P17; 90; C; MME; Packaging Machinery; PSQ,Q81).

"Our prices are higher than our rivals', but the boats we produce are wooden and hand made. Thus, the product and the price are not really comparable. Although most of our work is of a one-off nature, and pricing is individual to some extent, prices are nevertheless determined by costs rather than any other factor". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q81).

"Pricing is on a what the customer will pay basis. But expected wage levels, cost of materials in the future, inflation generally, oil, competition, etc., are additional considerations". (P19; 60; B; MME; Boats; PSQ, Q81).

"Although costs actually determine price, rising costs of production through inflation cause a constant revision of price levels". (P20; 120; B; MME; Luxury Boats; PSQ,Q81).

"Pricing is uniquely fixed according to costs, and the individual nature of the work. For example, a customer was unable to use a defective bricking machine and was losing £40 per hour. Although we could have easily charged a high market price for repairs, we decided to deliberately fix price below that level in the knowledge that this action was likely to secure a further and far more important contract". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q81).

"If our profits were unfavourable long term then the parent company would probably intervene and impose among other things, a pricing policy different from the C+% employed. But we ourselves would be expected to make allowances for such influences as inflation, expected labour costs, etc". (P22; 21; B; MME; Boats; PSQ,Q81).

"Costs determine price but from time to time expected wage bills, rival pricing, what the market will

pay, etc., could cause prices here to be slightly different from what they would normally be". (P23; 50; B; MME; Iron Castings; PSQ,Q81).

"The profitability of the previous period and what competitors are charging are probably the two main influences of price long term". (P24; 200; C; MME; Toolmaking; PSQ,Q81).

"The prices of our rivals RALCO are watched carefully, although we tend to welcome healthy competition in that it provides a reason for economy drives here. The occasional important customer might also influence price". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q81).

"Rival prices on the one hand and inflation on the other have had the long term effect of actually stabilising price. And since we do not charge what the market will bear this policy reinforces the stability". (P26; 70; A; MME; Trawler Repairs; PSQ,Q81).

"Costs are the determinants of price whilst market trends, parent company, special batches, competition, and delivery requirements are the influences over the longer term". (P27; 40; D; MME; Thermowells; PSQ,Q81).

"The special nature of certain contracts, e.g. one offs, and rival pricing, could influence our conception of what our price should be". (P28; 4; B; MME; Aluminium Castings; PSQ,Q81).

"The parent company, expected costs, and rival prices cannot be ignored when considering longer term pricing strategy". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q81).

"Rivalry for one-off jobs, overheads, and high setting up costs could cause final adjustments to price". (P31; 50; B; MME; Steelwork; PSQ,Q81).

"Price is based for the most part on costs and particularly the customer. Subsidiary influences include rival prices, and expected inflation if the contract is likely to be long scheduled". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q81).

"All one-off pricing is individually costed and then geared to the customer. Rival prices would be considered if sufficient competition arose". (P33; 3; A; MME; Luxury Yachts; PSQ,Q81).

"Rival pricing could have an influence on price especially on the more standard lines". (P34; 20; B; EE; Cold Rooms; PSQ,Q81).

"After price has been determined by C+% the cost of adapting plant processes to complete the more difficult jobs might also have to be considered along with expected inflation, the trade cycle, and rival pricing". (P35; 20; B; EE; Electric Motors; PSQ,Q81).

"Since we are a fairly new firm, the level of profit required and price tend to be set higher than that for existing firms whose fixed costs have probably been more or less written off. Rival prices, however, and inflation could, nevertheless, influence price over the longer term". (P36; 122; C; EE; Communication Equipment; PSQ, Q81).

"Costs determine price but our customers do know what a fair price is and we have to respond to this in the end". (P37; 37; C; EE; Location Systems; PSQ,Q81).

"The major price influences long term, as opposed to short run determinants, are rival pricing and market trends". (P38; 8; B; EE; Control Panels; PSQ,Q81).

"Recent rival imports of footwear have caused some concern, but prices have not been affected more than marginally as our product does sell irrespective of such developments". (P39; 800; D; TLCF; Footwear; PSQ,Q81).

"A profit mark-up of 7% has always been employed in the determination of price, and we do not as a rule appraise whether the market would or could pay more". (P40; 158; B; TLCF; Clothing; PSQ,Q81).

"We do not seek out that price which the market will bear since this has never been our policy. Price is determined simply by the C+% method". (P41; 150; C; TLCF; Clothing; PSQ,Q81).

"After price has been ascertained by the C+% method it is then left to the government department to approve it before contracts are finally signed. Thus, governments could be direct influences on price reductions from time to time. On the other hand, inflation is always an acceptable reason for price increases". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q81).

"Price has always been cost determined, but if we thought it likely to be profitable over the longer term, then price might be amended in relation to our competitors' prices". (P43; 13; C; TLCF; Wet Suits; PSQ,Q81).

"Normally, price is market determined by the building industry trade cycle in conjunction with the C+% method of pricing. But the nature of the work in hand, large repeat orders, etc., could also act as price influences on occasions". (P44; 45; D; BPG; Glass; PSQ,Q81).

"If rival pricing were threatening our price stability policy then action might have to be taken. Price also tends to be influenced when expensive new lines are introduced". (P45; 23; C; BPG; Pottery; PSQ,Q81).

"Rivalry, what the market will ultimately pay, and expected inflation are significant influences on price, although not on a day to day basis, after basic C+% fixing has taken place". (P46; 140; C; BPG; Pottery; PSQ, Q81).

"Prices have been influenced long term by competitors' prices and expected wage bills during rising inflation (1975)". (P47; 13; B; BPG; Pottery; PSQ,Q81).

"Costs are the main determinants of price not the market, nor rivals unless severe price cutting developed. Pricing is a fairly standard practice here". (P48; 25; C; Furniture; PSQ,Q81).

"Over a period of time, rival prices, V.A.T. on blinds, the number of designs produced, etc., could influence price after setting by C+%". (P49; 19; B; OMG; Blinds; PSQ,Q81).

"Rival price is always a factor to consider but even so, we must cover costs as a policy. Expected demand could, however, affect price in time". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q81).

"Costs determine price in the first instance, but occasionally discrimination has been practised on very small and very large orders. In the end, it is the market which controls price". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q81).

"Expected cost of materials, rival prices, expected wage rises, batch sizes, and what the market will of will not pay, are all likely to influence price periodically". (P52; 22; D; OMG; Coffins; PSQ,Q81).

"Costs provide the basis of price and then negotiation with local authorities takes place. Government spending on education undoubtedly influences these contracts in the long run". (P53; 20; C; OMG; Furniture; PSQ,Q81).

"Pricing is individual to the extent of reducing price to obtain a contract, or raising price in the absence of competition". (P54; 24; B; OMG; Printing; PSQ, Q81).

"The majority of contracts are one-offs and prices are largely fixed in relation to costs and market conditions. Final price adjustments, however, depend upon the customer in question". (P55; 25; A; OMG; Vehicles; PSQ, Q81).

"Rivalry could be an influence on price here since our policy is one of competitive pricing along with stability". (P56; 50; B; OMG; Printing; PSQ,Q81).

"Although costs have to be covered, pricing here is flexible according to the market and the customer. Rivalry tends to be rather modest in this trade and is rarely influential". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q81).

"Marginal costs form the basis of all pricing with the final fixing subject to what the customer will pay, rivalry, expected costs, and possible sales leverage". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q81).

"On occasions rival pricing, and the size of potential contracts, have had to be taken into account when pricing has been under consideration". (P59; 175; D; OMG; Concrete; PSQ,Q81).

"In the building trade, the position of the trade cycle is crucial in the determination of price. For example, if the cycle is low, then prices are low, and vice versa". (P60; 106; C; OMG; Building Materials; PSQ, Q81).

"Rival prices could be an influence, but fundamentally price is geared to costs". (P61; 124; C; OMG; Joinery Tools; PSQ,Q81).

"Pricing is usually subjected to a rival price adjustment and a customer rating. Expected inflation (1975) is also becoming a relevant factor". (P62; 400; C; OMG; Business Systems; PSQ,Q81).

"If rival prices are significantly low then these would affect pricing policy here. In the absence of this, however, expected wage bills and rising overheads are the important issues". (P63; 170; D; OMG; Colour Film Processing; PSQ,Q81).

"In the past, seasonal trends, rival pricing, and new breakthroughs, have influenced price on occasions after costs have determined it". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q81).

"Normal discounts, service, and delivery, are available to customers in lieu of price reductions but we very rarely change prices once they are quoted in our leaflets. Our stable price policy must be maintained". (P65; 30; B; OMG; Tents; PSQ,Q81).

The above responses might be assumed to fall into five broad categories. Long term price influences included market conditions, profitability, and technical problems of production. Another category claimed that no factor had influenced price specifically, and a final group consisting of the 9 price initiators referred to earlier, made up the total. Table 7.4 refers.

Table 7.4 Most Dominant Long Term Price Influences. Plymouth Survey

Price Influences	Employee Groups 0-24	25-99	100-199	200+	Totals
MARKET CONDITIONS					
Rivalry and rival pricing.	6 (23%)	4 (22%)	4 (33%)	3 (33%)	17 (26%)
What customer will pay.	2 (8%)	2 (12%)	1 (8%)	2 (22%)	7 (11%)
Expected demand.	2 (8%)	2 (12%)	1 (8%)	1 (11%)	6 (9%)
Industry led price.	1 (4%)		1 (8%)		2 (3%)
Parent Co.	1 (4%)	1 (5%)			2 (3%)
Govt. price control.		1 (5%)	1 (8%)		2 (3%)
Sub-totals	12 (46%)	10 (55%)	8 (67%)	6 (67%)	36 (55%)

Table 7.4 (Continued)

Price Influences	Employee Groups 0-24	25-99	100-199	200+	Totals
PROFIT-ABILITY					
Rising wage bills.	2 (8%)	1 (5%)			3 (5%)
Rising cost of materials.	1 (4%)	1 (5%)			2 (3%)
Rising overheads.	1 (4%)				1 (1%)
Expected inflation.	2 (8%)	2 (12%)	1 (8%)		5 (8%)
Sub-totals	6 (23%)	4 (22%)	1 (8%)		11 (17%)
TECHNICAL PROBLEMS					
Special contracts.	2 (8%)				2 (3%)
High set up costs.	1 (4%)				1 (1%)
Size of contract.	1 (4%)	1 (5%)			2 (3%)
Sub-totals	4 (15%)	1 (5%)			5 (8%)
NIL INFLUENCES					
P = f (C+%)	1 (4%)	1 (5%)	1 (8%)	1 (11%)	4 (6%)
ECONOMIC PRICING POLICY					
Flexible pricing.	3 (11%)	2 (12%)	2 (17%)	2 (22%)	9 (14%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 81

Market conditions were seen by 55% of the sample to be the one dominant long term price influence, and this feeling appeared to intensify in the larger firms. Price changes in response to profitability requirements were considered important by only 17% of the sample, and this predominated in the smaller firms. One might infer that pricing by the very small firms was influenced more by

profitability rather than by market conditions, whilst for the larger units, the opposite was the case.

However, to arrive at the truth, it is essential that the vital dist nction between short term price determinants and long term price influences be made. It has been revealed that price was initially determined by the C+% method of pricing by 86% of the sample. When long run price influences were examined, market conditions, profitability requirements, and technical problems of production were considered to be important by 80% of the firms - excluding the 14% who already practised flexible pricing. But Table 7.5 below shows that 66% of these price initiators were category "A" firms involved in specialist work mainly of a one-off nature where pricing could rarely be other than individual. Thus, even the firms practising flexible pricing, appeared to have this policy imposed upon them to some extent by the very nature of the work involved.

Table 7.5 Most Dominant Long Run Price Influences by Production Run Category. Plymouth Survey

Price Influence	Production Run Categories "A"	"B"	"C"	"D"	Totals
Market conditions.	2 (22%)	12 (57%)	13 (59%)	9 (69%)	36 (55%)
Profitability.		4 (19%)	4 (18%)	3 (23%)	11 (17%)
Technical problems.		2 (9%)	2 (9%)	1 (8%)	5 (8%)
Nil influences.	1 (11%)	1 (5%)	2 (9%)		4 (6%)
Economic pricing.	6 (66%)	2 (9%)	1 (5%)		9 (14%)
Totals:-	9	21	22	13	65

Source: Plymouth Survey Questionnaires; Question 81

Surprisingly, no category "D" firms, where production tended to be of a repeating nature, and where competition ranged from serious to severe, practised discernable short run price flexibility. However, some 69% of this group were conscious of market conditions, and claimed that price might be influenced by this factor long term. A further 23% of category "D" firms stated that price amendments could be made in response to profitability shortfalls, for example.

It is quite possible that this distinction between determinants and influences might go some way towards explaining the occasional conflict in the literature. For example, we know that Hall and Hitch (26) reported that firms were vague about marginalism. Sweezy (27) paralleled this finding. Earley (28), however, suggested that marginalism was strongly implanted in pricing behaviour. Hague (29) found that firms pursued secure incomes rather than profit maximisation, and there was no evidence of the application of the MC = MR rule. Skinner (30) concluded that C+% pricing was very much influenced by competition, demand, and the distinction between fixed and variable costs. Sizer (31) rejected Skinner's view that to distinguish between fixed and variable costs was tantamount to marginal costing. And Silbertson (32) felt that full cost pricing was well established but there were many marginalist and behavioural qualifications.

In the Plymouth Survey, C+% dominated the fixing of price in the short run, but over the longer term price <u>might</u> be adjusted in response to changing conditions not necessarily connected with costs. Nevertheless, even if some Plymouth firms did respond occasionally to changes in demand and profitability shortfalls by amending price, they certainly did not do this in a conscious profit optimising way. And even the 9 price initiators appeared

to have the policy forced upon them by events.

The vital question was whether firms wished to optimise profits and returns on investment, or not? If the former were the case, and one must assume that it was, since the Plymouth Survey firms did set themselves targets, then the inflexible pricing practised might be identified as one further reason why levels of profit were below those reasonably attainable for most of the firms. It was true that several interviewees believed that if they, like their rivals, adhered to a simple pricing rule based upon costs, they would in the long run "maximise" their profits. The underlying rationale here was that this would avoid the possibility of price wars and the like, and thus, eliminate an important source of uncertainty surrounding the firm's future actions. As the long run is an amorphous concept at best, one cannot determine empirically whether the above is correct or not. Therefore, it is probably reasonable to state that whilst pricing based upon costs will certainly not lead to maximum or even optimum profit, it is nevertheless, analogous to the satisficing behaviour described by Simon (33) giving rise to satisficing returns on investment, but no more.

ONE-OFF PRICING

Two arguments among others have been put forward as the main reasons for the widespread use of cost plus pricing. One is that firms are satisficers not maximisers. Associated with this argument is the belief that some firms genuinely want only a "fair" or "just" rate of profit. But the bulk of the evidence from the Plymouth Survey, for example, suggested that the size of the mark-up varied,

albeit over the longer term. And work by Hall and Hitch (34), Fog (35), and Kaplan (36) found similarly. None the less varying the profit margin is consistent with satisficing behaviour where once a level of profit has been achieved, firms may raise the level which they hope to make. And if it cannot be achieved, then they may lower their aspiration level as Simon (37) has suggested (38) (39).

The second argument is that in an uncertain world, firms just cannot estimate all the permutations of all the variables that should be taken into account in order to derive the optimum price. The number of permutations may run into billions, even on a simple problem; a point demonstrated by both Baumol (40) and Clarkson (41). And even if full data were available, the calculation of the profit optimising price would be a costly process. Bearing this in mind, it may well be better to simply apply a standard mark-up to basic costs, which is known from experience to work reasonably well, short of actually optimising profits. Cyert and March (42) suggest that this does suffice as a first approximation. Firms themselves may see cost plus as the best they can do in the long run in a complex and uncertain world where conditions are continually changing. Whether or not long run profits ever approached the optimum depended, of course, on the skill and resolution of the practitioners in responding to those changing circumstances.

As far as the Plymouth Survey was concerned there was little dispute that cost plus was the most common method used for price setting. But finding out what really does motivate managers is unfortunately an extremely difficult task. Interviewees are not beyond suspicion since what they honestly think they are doing on behalf of the firm may not necessarily coincide with what is actually

being done. For example, Lanzillotti (43) after interviewing many large American firms concluded that profit was not their dominant motive. Yet a majority of these same companies when asked about pricing said they did not think that changing price would increase their long run profits. But an even more notable example concerned one-off pricing within the Plymouth Survey.

The Plymouth data gave the clear impression that pricing tended to be rigid. Indeed, several firms quoted that price stability was a specific policy of the company. Only 14% of the sample were engaged in what might be described as flexible pricing on normal production. But did this mean that the majority of the firms never practised economic pricing? When interviewees were asked about the pricing of one-off jobs (if applicable) there appeared to be rather more flexibility than one might have supposed.

"The occasional special batches are priced by C+% plus a re-tooling mark-up". (Code P1; Employees 486; Production Run Category C; S.I.C. FDT, Main Activity Food; Source Plymouth Survey Questionnaires, Question 80).

"One-off batches would be costed at an economic price". (P8; 300; C; FDT; Bread; PSQ,Q80).

"Total costs would be estimated for a one-off job and a 25% mark-up added (15% for routine items) plus an inconvenience %". (P9; 15; D; CAI; Fertiliser; PSQ,Q80).

"If one-offs are undertaken price = material target cost + 0.45 + market %". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q80).

"A mark-up of between 0% and 100% could be applied to any one-off jobs depending on whether profits or sales are required. Costs themselves would be based upon materials, labour, and the expense of adapting any special equipment". (P12; 8; C; MME; Injection Moulds; PSQ,Q80).

"Most of our work is of a one-off nature and pricing is based upon the C+% method with a market adjustment long run". (P13; 170; B; MME; Steelwork; PSQ,Q80).

"Very few one-offs are undertaken but price = C+% plus a further % in respect of the market". (P14; 468; B; MME; Machine Tools; PSQ,Q80).

"One-offs are priced by C+20% provided that this does not exceed prices charged by our rivals". (P15; 14; B; MME; Industrial Signs; PSQ,Q80).

"One-off prices = cost + 15% + setting up %". (P16; 10; C; MME; Press Tools; PSQ,Q80).

"The hourly labour rate is more important when one-offs are calculated than for routine production. Also, on very small orders a 25% to 50% mark-up may be added against a 15% to 30% for large batches". (P17; 90; C; MME; Packaging Machinery; PSQ,Q80).

"One-offs are priced by C+% and perhaps subject to rival prices". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q80).

"All pricing is of an individual nature, and one-offs are no exception to this". (P19; 60; B; MME; Boats; PSQ,Q80).

"Pricing one-offs consists of costs plus a 20% labour charge plus a 25% profit mark-up (20% for routine work)". (P22; 21; B; MME; Boats; PSQ,Q80).

"All jobs are one-offs and all pricing is unique". (P21; 1; A; MME; Repair of Cylinder Blocks; PSQ,Q80).

"A profit margin of up to 20% (15% on routine work) is added to full costs and an extra time % in order to determine the price of any one-off job". (P23; 50; B; MME; Iron Castings; PSQ,Q80).

"One-offs are priced by C+30% and over (but only up to 30% for routine production) with a weighted % added for inconvenience". (P24; 200; C; MME; Toolmaking; PSQ,Q80).

"Although all production is one-off, price is based exclusively on C+%. However, the specialised nature of the work is reflected in the cost base, e.g. design, setting up, research, etc". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q80).

"One-off pricing consists of cost + 15% to 25% (10% to 20% for routine work) + a % for assessed re-tooling and training of labour". (P26; 70; A; MME; Trawler Repairs; PSQ,Q80).

"Special tooling, labour training, basic costs + % profit make up the price for most one-off jobs". (P27; 40; D; MME; Thermowells; PSQ,Q80).

"Pricing of one-off jobs depends mainly upon the customer and the possibilities of further work. The profit mark-up is widely variable". (P28; 4; B; MME; Aluminium Castings; PSQ,Q80).

"A heavier weighting is allocated to labour, materials, overheads, and the profit margin when one-offs are calculated". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q80).

"The profit mark-up for routine jobs is approximately 10%; for one-offs it is 25% plus". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q80).

"What the market will pay figures more prominently in the calculation of one-off pricing than for routine items". (P31; 50; B; MME; Steelwork; PSQ,Q80).

"All pricing is geared to the customer whether it be for routine production or one-offs". (P32; 140; A; Special Purpose Machines; PSQ,Q80).

"All jobs are priced individually in relation to costs, rivals, customers, etc". (P33; 3; A; MME; Luxury Yachts; PSQ,Q80).

"One-off contracts would require individual pricing, but costs would still have to be covered". (P34; 20; B; EE; Cold Rooms; PSQ,Q80).

"Pricing of one-offs involves costs + enhanced % profit mark-up". (P35; 20; B; EE; Electric Motors; PSQ, Q80).

"Materials + labour + overheads + one-off % + 35% profit (20% for batch items) = one-off price". (P37; 27; C; EE; Location Systems; PSQ,Q80).

"Pricing is based on the C+% method, but for one-offs what the customer will actually pay is also taken into account". (P38; 8; B; EE; Control Panels; PSQ,Q80).

"A tariff is usually added to the trade price when calculating the occasional one-off job". (P44; 45; D; BPG; Glass; PSQ,Q80).

"One-off price = costs + % profit + % setting up". (P47; 13; B; BPG; Pottery; PSQ,Q80).

"No one-off jobs are undertaken but the pricing of very small batches would be no different from the individual pricing system adopted". (P54; 24; B; OMG; Printing; PSQ,Q80).

"All jobs are one-off and price is related to the customer in the main". (P55; 25; A; OMG; Vehicles; PSQ, Q80).

"Pricing is based on what the market will bear at given levels of output". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q80).

"Production is mainly one-off and all pricing is subjected to the market for determination". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q80).

"The pricing of one-off jobs depends on the work. If we expect to gain knowledge or expertise we bear part of the development costs. Otherwise, price depends on what the market will pay". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q80).

In short, out of the 36 firms in the sample who were able to handle one-off jobs, exactly 50% of them practised far more price flexibility than they did on routine pricing. For example, charging what the market would pay, employing a more liberal profit margin, etc. And a further 44%, whilst not necessarily charging what the customer would pay, did add a one-off inconvenience % to the basic C+% price. Thus, it appeared that flexible pricing was by no means impracticable, at least on one-off contracts. And, no doubt, profit would very likely be made as a result. No firm claimed, for example, that one-offs were unprofitable. Indeed, firm P12 added a 0% to 100% mark-up on costs depending upon whether profits or sales were required. Yet this firm simply applied C+% to all routine items. Firm P28 priced all one-off jobs according to the customer and the possibilities of further work. But its

routine pricing was geared exclusively to C+%. What the market would pay figured far more prominently in the calculation of one-off pricing for firm P31 than for batch production. Firm P64 priced according to the nature of the work and what the market would bear, but again, routine production was priced by conventional C+%.

Table 7.6 One-Off Pricing Flexibility. Plymouth Survey

	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Price = C+% and what customer will pay.	8 (53%)	3 (30%)	3 (75%)	4 (57%)	18 (50%)
Price = C+% plus a one-off inconvenience %.	6 (40%)	7 (70%)		3 (43%)	16 (44%)
Cost + % only.	1 (7%)		1 (25%)		2 (6%)
Sub-totals	15	10	4	7	36
No one-off jobs undertaken.	11	8	8	2	29
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 80

It is not meant to declare, of course, that flexible pricing guarantees profitability, although the Plymouth Survey findings did hint at this possibility (refer Capsule XVI, Chapter 9). What is demonstrated is that flexibility is possible, is practised, and is no doubt successful, but almost entirely on one-off jobs.

TARGET PRICING

Closely allied to full cost pricing is pricing in order

to achieve a target rate of return on investment, the subject of Chapter 6. Targeting was found by the Brookings Study (44) to be the commonest pricing policy employed by very large firms in the U.S.A. In effect these firms set out to achieve a target return in the long run by calculating the approximate mark-up on full costs according to the formula:-

$$\text{\% mark-up to achieve target rate of return on net assets} = \text{Target rate of return} \times \frac{\text{Net assets}}{\text{Sales}}$$

Assuming that net assets = £1m; sales = £2m; and the return on net assets is set conventionally at 20%; then the % mark-up on costs would require to be at least 10%, i.e. 20% X $\frac{£1m}{£2m}$. Clearly, the target rate of return and the mark-up on costs are mathematically related to the ratio of $\frac{\text{Sales}}{\text{Net assets}}$. In the above example, the ratio is 2, which indicates that if the target rate of return is set at Y%, then the mark-up on costs must be at least 0.5Y% in order to achieve this target. Anything below 0.5Y% will be inadequate.

There is some controversy as to whether the achievement of a target rate of return should be regarded as a managerial tool or as an objective of the firm. Baldwin (45), Chamberlain (46), and Kahn (47), prefer to treat it as the former rather than the latter. According to Baldwin, "It seems far more reasonable to assume that a target rate of return is a tool, used to assist in the attainment of other goals". Chamberlain regards it as one of several "Useful instruments in the firm's objective of making a profit". One suggestion as to how target pricing can be used as a managerial tool comes from Means (48) whereby "The price-taker starts with an estimate of the

highest rate of profits which will not induce new entrants and then works backwards to determine the prices which will just yield that rate of profit when operating at a reasonable proportion of capacity".

However, the findings of the Brookings Study (49) originally conducted between 1948 and 1951, but subsequently updated, suggested that the firms concerned invariably sought to earn satisfactory returns by the setting of profit targets beforehand. And we have witnessed the considerable extent to which the Plymouth Survey firms adopted the target rate of return on net assets as a yardstick. Targeting as an objective would appear to be fairly widespread, at least among small firms. But we also noted that 61% of the Plymouth sample failed to reach their targets in the period under review. Various reasons have already been suggested for this failure rate, but how much mathematical co-ordination existed between the target rate of return and the % mark-up on costs? If, for example, the % mark-up was set below that determined by the formula, then targets would not be reached. And even if the mark-up were initially correct, but firms did not adjust price in response to rising costs of production, then the mark-up would soon become insufficient to achieve the target. We do know that the Plymouth Survey firms tended towards price rigidity in the main, implying flexible and thus, incorrect profit mark-ups. Table 7.7 below demonstrates clearly the general lack of mathematical harmony between the target rate of return and the average % mark-up taken from the firms' annual returns at Companies House, London. The firms failing to reach their targets could hardly have done otherwise with the ultimate % mark-ups employed.

Table 7.7 Relationship Between Target Return on Net Assets and % Mark-Up on Costs. Plymouth Survey 38 Firm Sample (72-74)

Firm	Target Rate of Return	Sales Assets Ratio	Mark-Up Required to reach Target	Average Mark-Up from A/cs.	Resultant Return on Net Assets from A/cs.	Comment
P1	50%	4.27	11.70%	5.35%	22.90%	Wrong MU
P2	20%	1.5	13.30%	3.28%	4.94%	Wrong MU
P4	25%	1.55	16.12%	18.69%	28.99%	
P5	20%	3.7	5.40%	3.26%	12.11%	Wrong MU
P6	22½%	7.03	3.20%	1.74%	12.30%	Wrong MU
P7	10%	1.59	6.28%	4.38%	6.99%	Wrong MU
P9	20%	1.43	13.98%	3.20%	4.59%	Wrong MU
P11	15%	2.3	6.50%	3.75%	8.67%	Wrong MU
P14	40%	1.66	24.09%	2.22%	3.69%	Wrong MU
P17	20%	2.26	8.84%	8.37%	18.94%	Wrong MU
P19	25%	9.42	2.65%	4.40%	41.56%	
P20	50%	6.78	7.37%	6.92%	47.01%	Wrong MU
P21	20%	4.61	4.33%	7.59%	35.07%	
P24	33%	3.35	9.85%	12.39%	41.52%	
P25	50%	1.35	37.03%	14.57%	19.68%	Wrong MU
P26	50%	2.14	23.36%	0.62%	1.33%	Wrong MU
P27	20%	4.86	4.11%	-9.30%	-45.30%	Wrong MU
P28	20%	3.44	5.81%	6.90%	23.78%	
P30	22½%	2.34	9.61%	11.54%	27.02%	
P31	15%	21.1	0.71%	-0.30%	-6.41%	Wrong MU
P32	20%	2.69	7.43%	8.21%	22.10%	
P34	20%	2.41	8.29%	4.75%	11.46%	Wrong MU
P35	20%	3.97	5.03%	20.08%	79.85%	
P36	33%	3.55	9.29%	1.12%	4.01%	Wrong MU
P38	20%	2.76	7.24%	-17.74%	-49.01%	Wrong MU
P39	22%	2.66	8.27%	2.51%	20.00%	Wrong MU

Table 7.7 (Continued)

Firm	Target Rate of Return	Sales Assets Ratio	Mark-Up Required to reach Target	Average Mark-Up from A/cs.	Resultant Return on Net Assets from A/cs.	Comment
P41	33%	8.59	3.84%	-2.96%	-25.49%	Wrong MU
P46	20%	6.86	2.91%	2.97%	20.46%	
P49	50%	3.4	14.70%	-16.91%	-57.54%	Wrong MU
P50	20%	11.52	1.73%	1.14%	13.28%	Wrong MU
P53	20%	23.18	0.86%	4.50%	104.73%	
P54	20%	3.0	6.66%	13.77%	41.37%	
P55	20%	1.61	12.42%	18.04%	29.05%	
P57	33%	3.64	9.06%	10.90%	39.72%	
P58	20%	2.45	8.16%	6.14%	15.07%	Wrong MU
P61	20%	4.89	4.08%	5.97%	29.27%	
P62	15%	2.8	5.35%	8.20%	23.01%	
P65	40%	2.61	15.32%	5.87%	15.33%	Wrong MU
Mean	26.15%			Mean 4.89%		
S.D.	11.36			S.D. 7.91		
Full 65 Firm Sample (70-75) Mn 3.81%						

Source: Plymouth Survey Questionnaires;
Questions 71, 34, 32, and 26.
Companies House, Annual Returns, London

Not only did the actual mark-up rarely coincide with that required to achieve the target, but also it rarely harmonised with the firm's basic C+% margin. Undoubtedly, inflationary costs of production would account for this to some extent. What 61% of the firms had failed to do was to adjust the price as costs rose to ensure that the target rate of return would be reached in the longer term. Price rigidity might have maintained customer relations,

but it had also hindered financial performance as the following extracts show.

"Our basic profit margin is 8% although this does vary over time. The absolute minimum mark-up acceptable would be around 4%".
(NB) Required mark-up = 11.7%; actual = 5.35%
(Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnairs, Questions 82, 83 and 84).

"The mark-up % varies over periods of time. No minimum % has ever been laid down".
(NB) Required mark-up = 13.3%; actual = 3.28%
(P2; 95; D; FDT; Brewing; PSQ,Q82, 83 and 84).

"Different mark-ups are employed for different products and some are as high as 30%. But the average would be about 20%. Normally, we would prefer fixed margins, and in the main, these are achieved".
(NB) Required mark-up = 16.12%; actual 18.69%
(P4; 600; D; FDT; Baby Food; PSQ,Q82, 83 and 84).

"The basic mark-up is 8% but it does tend to vary in line with price stability".
(NB) Required mark-up = 5.4%; actual = 3.26%
(P5; 120; D; FDT; Medicated Pastilles; PSQ,Q82, 83 and 84).

"The mark-up varies according to long run conditions and ranges from 2% to 5%. The former would also be regarded as the minimum margin acceptable".
(NB) Required mark-up = 3.2%; actual 1.74%
(P6; 450; D; FDT; Meat; PSQ,Q82, 83 and 84).

"20% is the basic mark-up although this can never be maintained long run. The minimum acceptable would be any % greater than zero contributing to fixed costs".
(NB) Required mark-up = 6.28%; actual = 4.38%
(P7; 20; C; FDT; Minerals; PSQ,Q82, 83 and 84).

"As a standard practice 15% is added to costs. However, this is variable to obtain orders on the one hand, or to raise profit on the other. No formal minimum exists".
(NB) Required mark-up = 13.98%; actual = 3.2%
(P9; 15; D; CAI; Fertiliser; PSQ,Q82, 83 and 84).

"Our formal margin stands at 22% which could be reduced to whatever minimum the situation demanded".
(NB) Required mark-up = 6.5%; actual = 3.75%
(P11; 124; C; MME; Valves and Cylinders; PSQ,Q82, 83 & 84).

"We would normally require 20% on costs but this could be varied subject to the market. That % actually being charged at a given moment would be regarded as the minimum acceptable".
(NB) Required mark-up = 24.09%; actual = 2.22%
(P14; 468; B; MME; Machine Tools; PSQ,Q82, 83 and 84).

"For routine work the margin would be initially set between 15% and 30% although costs are never easy to calculate accurately. A figure lower than 15% might be acceptable as a minimum".
(NB) Required mark-up = 8.84%; actual = 8.37%
(P17; 90; C; MME; Packaging Machinery; PSQ,Q82, 83 and 84).

"A 10% mark-up is usually required which is widely variable short run as required. However, we would not wish to accept below 5% as a rule".
(NB) Required mark-up = 2.65%; actual = 4.4%
(P19; 60; B; MME; Boats; PSQ,Q82, 83 and 84).

"As a rule of thumb, 9% is marked-up but we are always prepared to vary this long run. Any margin actually below 9% would automatically be assumed to be the minimum".
(NB) Required mark-up = 7.37%; actual = 6.92%
(P20; 120; B; MME; Luxury Boats; PSQ,Q82, 83 and 84).

"Profit margins could range between 10% and 50% depending on the job in question. This minimum could be very low indeed, e.g. greater than zero".
(NB) Required mark-up = 4.33%; actual = 7.59%
(P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q82, 83 and 84).

"Margins vary up to 30% for routine production but very short run price changes do not occur. The minimum acceptable mark-up would hopefully be not lower than 20%".
(NB) Required mark-up = 9.85%; actual = 12.39%
(P24; 200; C; MME; Toolmaking; PSQ,Q82, 83 and 84).

"Mark-ups vary according to market conditions but 20% would be required as a rule. The minimum could be as low as 5% if further orders were thought possible, but we are not likely to produce at cost".
(NB) Required mark-up = 37.03%; actual = 14.57%
(P25; 385; A; MME; Paper Converting Machines; PSQ,Q82, 83 and 84).

"Routine production could be marked-up between 10% and 20% but this flexibility would not normally be

applicable over the short run. Minimum margins are not easy to declare but 5% might be an appropriate figure".
(NB) Required mark-up = 23.36%; actual 0.62%
(P26; 70; A; MME; Trawler Repairs; PSQ,Q82, 83 and 84).

"The standard mark-up is 10% on routine items but this tends to vary according to prevailing conditions. We have, for example, accepted a negative margin on occasions in order to sustain plant operation".
(NB) Required mark-up = 4.11%; actual = -9.3%
(P27; 40; D; MME; Thermowells; PSQ,Q82, 83 and 84).

"Routine production is marked-up between 10% and 20% but the variability is not on a daily basis. Any contribution to overheads, i.e. in excess of zero % would be regarded as the minimum acceptable, although it does depend on the nature of the work".
(NB) Required mark-up = 5.81%; actual = 6.9%
(P28; 4; B; MME; Aluminium Castings; PSQ,Q82, 83 and 84).

"Our standard mark-up is 30% but this only applies when conditions permit. For example, we have accepted 10% when there has been no real alternative".
(NB) Required mark-up = 9.61%; actual = 11.54%
(P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ, Q82, 83 and 84).

"Mark-ups vary between 5% and 15% according to the market. Although 5% would be regarded as the minimum, we have had to accept less than this on occasions".
(NB) Required mark-up = 0.71%; actual = -0.3%
(P31; 50; B; Steelwork; PSQ,Q82, 83 and 84).

"Pricing is based upon the customer but a 15% mark-up is a useful rule of thumb. In actuality, margins have varied between 0% and 50%".
(NB) Required mark-up = 7.43%; actual = 8.21%
(P32; 140; A; MME; Special Purpose Machines; PSQ,Q82, 83 and 84).

"The mark-up laid down is 25% to 33% but this depends entirely on the nature of the work, and market conditions long term. We might agree to a 10% margin or lower if we had no alternative".
(NB) Required mark-up = 8.29%; actual = 4.75%
(P34; 20; B; EE; Cold Rooms; PSQ,Q82, 83 and 84).

"For routine work a 25% margin is employed. This is variable in response to market conditions over periods of time. The mark-up has been as low as 5%, and this

would probably be regarded as the minimum acceptable return".
(NB) Required mark-up = 5.03%; actual = 20.08%
(P35; 20; EE; Electric Motors; PSQ,Q82, 83 and 84).

"Long run mark-ups vary between 10% and 15% depending upon the size of the contract, inflation, loss leader concept, etc. We would normally regard 5% as the minimum limit although even this might not be enforceable".
(NB) Required mark-up = 9.29%; actual 1.12%
(P36; 122; C; EE; Communication Equipment; PSQ,Q82, 83 and 84).

"At least 10% would normally be required on routine items. This, however, is variable over the longer term. If there were no alternative, then perhaps 4% would be an acceptable minimum, but this really depends on market circumstances".
(NB) Required mark-up = 7.24%; actual = -17.74%
(P38; 8; B; EE; Control Panels; PSQ,Q82, 83 and 84).

"Mark-ups vary on the different lines but a desirable average would be 20%. As far as the minimum acceptable margin is concerned, this would simply be that % provided by the market at any given time".
(NB) Required mark-up = 8.72%; actual = 2.51%
(P39; 800; D; TLCF; Footwear; PSQ,Q82, 83 and 84).

"The profit margin is usually very much influenced by the customer and can be as low as 5%. Incidentally, this figure would be regarded normally as the minimum we could reasonably accept".
(NB) Required mark-up = 3.84%; actual = -2.96%
(P41; 150; C; TLCF; Clothing; PSQ,Q82, 83 and 84).

"6% is our required mark-up but this is very much dominated by seasonal demand. The minimum margin acceptable would be any contribution to fixed costs".
(NB) Required mark-up = 2.91%; actual = 2.97%
(P46; 140; C; BPG; Pottery; PSQ,Q82, 83 and 84).

"Our standard mark-up is 10%. But currently owing to market trends, recessionary economic conditions, etc., certain margins have had to be negative".
(NB) Required mark-up = 14.7%; actual = -16.91%
(P49; 19; B; OMG; Blinds; PSQ,Q82, 83 and 84)

"Although 15% profit is required, this is rarely maintainable in the real world. On the other hand, it is not our policy to engage in deliberate short run price

changes, despite the fact that our Birmingham rivals can actually sell below our costs of production".
(NB) Required mark-up = 1.73%; actual = 1.14%
(P50; 44; C; OMG; Cardboard Containers; PSQ,Q82, 83 and 84).

"We require a 10% return on sales as a rule but current inflation has not permitted this. In the past the minimum mark-up has actually been as low as 0%".
(NB) Required mark-up = 0.86%; actual = 4.5%
(P53; 20; C; OMG; Furniture; PSQ,Q82, 83 and 84).

"All pricing is individually assessed, and mark-ups vary between 10% and 33%. The former would be regarded as the minimum but it could be below this in exceptional circumstances".
(NB) Required mark-up = 6.66%; actual = 13.77%
(P54; 24; B; OMG; Printing; PSQ,Q82, 83 and 84).

"Pricing is geared to the customer and mark-ups are entirely variable".
(NB) Required mark-up = 12.42%; actual = 18.04%
(P55; 25; A; OMG; Vehicles; PSQ,Q82, 83 and 84).

"A mark-up of between 20% and 30% would be desirable, but we may have to come down to 10% on occasions".
(NB) Required mark-up = 9.06%; actual = 10.9%
(P57; 2; A; OMG; Diamond Wheels; PSQ,Q82, 83 and 84).

"Our standard margin is 20% which is always subject to negotiation with the customer. Consequently, the minimum acceptable mark-up is any contribution to overheads".
(NB) Required mark-up = 8.16%; actual = 6.14%
(P58; 17; A; OMG; Plastic Mouldings; PSQ,Q82, 83 and 84).

"Originally our mark-up was fixed at $2\frac{1}{2}\%$ in 1971, but rising to at least 10% over time. However, the actual margin does tend to be simply what the market will produce".
(NB) Required mark-up = 4.08%; actual = 5.97%
(P61; 124; C; OMG; Joinery Tools; PSQ,Q82, 83 and 84).

"Our mark-up on average is about 15%, although it is currently nearer $7\frac{1}{2}\%$ due to conditions beyond our control. Pricing does tend to be influenced by rivals and particularly the customer. However, $7\frac{1}{2}\%$ would probably be regarded as the minimum acceptable".
(NB) Required mark-up = 5.35%; actual = 8.2%
(P62; 400; C; OMG; Business Systems; PSQ,Q82, 83 and 84).

"Normally we require about 20% as a mark-up but this varies in accordance with the need to maintain price stability".
(NB) Required mark-up = 15.32%; actual = 5.87%
(P65; 30; B; OMG; Tents; PSQ,Q82, 83 and 84).

Therefore, it would seem that the co-ordination of target return on investment and cost plus pricing was difficult to achieve even over the longer term. The problem clearly lay in the extent to which the firm was willing to push beyond the limits of a pricing method to some average return philosophy.

One crucial aspect of this is the choice of the target rate of return in the first instance. We have seen that 61% of the Plymouth sample had failed to reach their targets. Was the target set too high, or the mark-up too low as suggested in the previous table? In answer to this, it can only be stated that the firms set their targets largely by convention and no doubt based upon what they considered to be reasonably attainable. In support of this, Lanzillotti (50) noted a wide range of explanations for the choice of a specific target return. The most frequently mentioned rationalizations included "fair or reasonable return", "the traditional industry concept of a fair return in relation to risk factors", "desire to equal or better the company average return over a recent period", and "what the company felt it could get as a long run matter". One might reasonably conclude from this, and also because of the preference for price stability among the Plymouth firms, that the problem of failing to reach expected targets lay more within the pricing rather than the targeting.

And this is given some support by Tamari's "Postal Questionnaire Survey of Small Firms" (51). The following profit margins, which can only be described as modest, relate to the periods 1964 and 1968.

Table 7.8 Profit as a % of Turnover in U.K. Manufacturing Firms

Years	Employees		
	0-24	25-99	100-199
1964	5.5%	5.6%	5.6%
1968	5.1%	5.3%	5.1%
Median	3.6%	3.5%	4.3%

Source: Committee of Inquiry on Small Firms, Research Report No. 16, "A Postal Questionnaire Survey of Small Firms, an Analysis of Financial Data", by M. Tamari, p 30.

Of course, the analysis of the profitability of firms is difficult both because of the nature of financial records, and because of conceptual difficulties of definition and actual measurement. As a result of varying accounting practices, the size of one firm's recorded profits, even at Companies House, London, may artificially differ from another. There may be arbitrary differences in write-off policy, and differences in capital charges, and in the allocation of expenses incurred during a particular year which relate to activities of other years. In a small firm owned by a family, or closely knit group of people, additional problems may exist which add to the difficulty of inter-firm comparisons. More often than not, the profit figure is the information which firms are most reluctant to give. It may well be for tax reasons, or because of fear of competition, or it may be inaccurate because of a lack of correct information on the part of the firm's management. Thus, the figures obtained must be viewed in this light. Nevertheless, the overall impression of sub-optimum returns emerges strong.

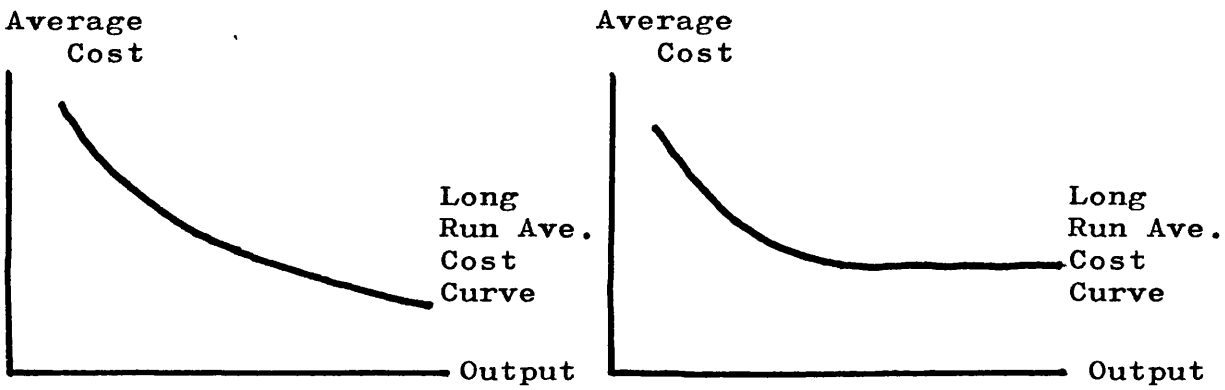
COSTS OF PRODUCTION

There can be little doubt that empirical evidence in general, and that from the Plymouth Survey in particular, strongly supports the view that C+% is the most common method used for the determination of prices in practice. But one drawback of the method rests on the assumption that firms actually know what their costs of production are at given levels of output. In short, this would imply a knowledge of the shape and position of the average cost curve.

Unfortunately, as Hawkins (52) points out, there has been a long drawn out, and as yet unresolved, dispute among economists as to the behaviour of firms' costs of production, especially in the long run. Traditionally, the long run average cost curve of a firm is assumed to be "U-shaped"; the initial fall is assumed to reflect economies of scale which continue until output is raised to an optimum plant size; thereafter diseconomies of scale are assumed to set in. Traditionally, it has been argued that as the firm gets larger it will experience diseconomies in management, administration, and selling. Even the most modern micro-economic textbooks tend still to be based on predominantly U-shaped long run average cost curves, despite the fact that there is mounting empirical evidence to suggest that costs of production do not generally rise as firms expand, i.e. to suggest that long run average cost curves are L-shaped, either flat or falling as shown in Fig. 7.2. For evidence, further references, and discussion of the problems of measurement, Wiles (53), Johnson (54), Pratten (55), Pratten et al (56), and the N.B.E.R. price studies (57), could be consulted. For examples of the more sceptical viewpoint, Smith (58), Friedman (59), and Silbertson (60), are of

some relevance.

Fig 7.2 The Long Run Average Cost Curve



Source: Plymouth Survey Questionnaires; Question 85

It is surprising that even today an economist may feel mildly heretical in suggesting that an "L" rather than a "U" best describes the behaviour of long run costs of production of firms. It is surprising because even before the beginning of this century John Stuart Mill (61) had noted that "there was a tendency to substitute more and more, in one branch of industry after another, large establishments for small ones". And Marshall (62) despite his belief that the economy could generally be represented by a competitive structure, none the less saw the possibility that the production of certain commodities might conform "to the law of increasing returns in such a way as to give a very great advantage to large producers".

Economists today are still divided over the importance of economies of scale. At one extreme there are those who believe that L-shaped long run average cost curves are rarely if ever relevant; at the other there

are those who believe that they are typical at least of modern manufacturing industry.

P. J. D. Wiles (63) has argued strongly for the adoption of L-shaped cost curves as the norm. After reviewing a considerable amount of empirical evidence, he concludes that: "The long run average cost curve descends like the left hand branch of a capital U, swiftly at first, and then more gently. Decreasing costs with size are almost universal. But the U seldom turns up again. Sharply increasing costs with size are practically unknown, and even slight increases are rare. Sixty per cent of the examples obey what we may call the law of "L-shaped" costs. Another 31% show a slight increase of costs in the largest size class. Most, but by no means all, of these slight increases are well within the expected margin of error that any empricial correlation should show".

Johnston (64) summarises and reviews a wide range of empirical studies and provides an excellent "critique of the critics". For him, the impression which stands out most clearly is "the preponderance of the L-shaped pattern of long run average cost that emerges so frequently from the various long run analyses".

More recently, the Department of Applied Economics at Cambridge, i.e. Pratten (65), and Pratten, Dean, and Silbertson (66), has completed what is probably the most extensive analysis so far of industry by industry data on the behaviour of costs of production in Britain. Surveying the final data of 25 major industries, Pratten concludes: "Our estimates show that there are substantial technical economies of scale for the production of many products". But in addition to economies on the production side, it was also found that large firms "can achieve economies by spreading certain marketing and management

costs, and in some cases by spreading expenditure on research". The Cambridge study is not encouraging for any who feel that economies of scale are a temporary issue. It concludes that both the magnitude of economies of scale, and the range of output to which they apply, are increasing over time. It should be noted, however, that as with all emprirical testing, the results are open to interpretation, and Silbertson (67) argues that the Cambridge study shows relatively few industries still experiencing significant scale economies when output is related to the size of the U.K. market.

Other statistical analyses of long run cost behaviour in a preponderance of cases reveal an L-shaped pattern for the LRAC curve. Table 7.8 summarises the results of several major studies of long run cost functions.

Table 7.8 Results of Empirical Studies of Long Run Cost Functions

Name	Type of Industry	Findings
Bain (1956)	Manufacturing	Small economies of scale for multi-plant firms
Holton (1956	Retailing	LRAC curve is L-shaped
Alpert (1959)	Metal	Economies of scale up to an output of 80,000 lb per month; constant returns to scale and horizontal thereafter.
Moore (1959)	Manufacturing	Economies of scale prevail quite generally.
Lomax (1951) and Gribbin (1953)	Gas (G.B.)	LRAC of production declines as output rises.
Lomax (1952) and Johnston (1960)	Electricity (G.B)	LRAC of production declines as output rises
Johnston (1960)	Life Assurance	LRAC declines

Table 7.8 (Continued)

Name	Type of Industry	Findings
Johnston (1960)	Road Passenger Transport	LRAC either falling or constant.
Nerlove (1961)	Electricity (USA)	LRAC (excluding transmission costs) declines, then shows signs of increasing.

Source: A. A. Walters, "Production and Cost Functions", Econometrica, Vol. 31, No. 1, (Jan. 1963), pp 1-66.

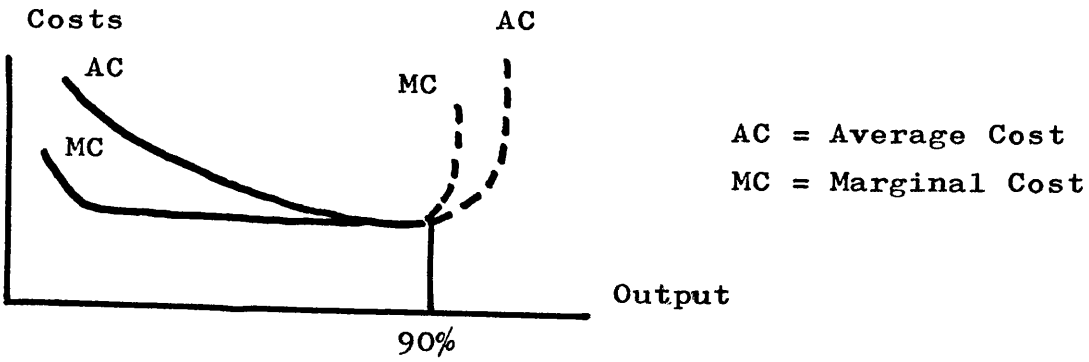
None of these studies presents conclusive evidence that firms actually encounter significant diseconomies of scale in the range of observed data. Rather the long run average cost curve has generally been found to decrease and then level off as output rises. However, the failure to find much evidence of diseconomies of large size does not mean that the LRAC curve does not turn upwards at some point. Instead, the evidence suggests that most firms have been wise enough to avoid becoming so large as to incur rising unit costs. The lack of large firms in several industries is adequate testimony to the existence of diseconomies, though it does appear that diseconomies may not be as pervasive as once imagined.

Opponents of L-shaped long run average costs base their case either on criticisms of the technical validity of much of the empirical evidence, but more specifically on the belief that, even though empirical evidence overwhelmingly suggests constant or falling average costs up to levels of output so far experienced, there must none the less come a point, as output increased, when diseconomies of scale will eventually make themselves felt. Arguments about what may or may not happen in the far distant future at hypothetical output levels are un-

fortunately impossible to refute without the evidence in the first place. It seems reasonable to accept that for many products, L-shaped long run average cost curves best fit the available empirical evidence.

As for the behaviour of production costs in the short run, empirical evidence has suggested nothing more startling than that the average cost surve is skewed rather than symmetrical. Average costs, it seems, tend to a minimum when plant is working at or near designed maximum output. Beyond designed capacity, costs rise almost vertically. Some writers have argued that no firm would operate on the almost vertical dotted section in Fig. 7.3, and so the short run average cost curve should therefore be described as L-shaped falling all the way to designed maximum output.

Fig 7.3 Skewed Short Run Average Cost Curve



Source: A. A. Thompson, "Economics of the Firm", Prentice Hall, 1973, p 289.

In fairness, however, there seems to be no good reason why one should not include the information that if one attempts to raise output past the designed maximum, it is virtually impossible to do so except at the expense of a very dramatic increase in costs. After all, it is

the knowledge that costs behave in this way that prevents most firms from operating on the near vertical section. If this information is included, then we achieve the skewed U-shape cost curve.

Economists have conducted a great many studies of the short run cost functions, in addition to long run, of particular firms and industries. A wide variety of accounting, engineering, and econometric methods have been used to analyse historic cost and output data. Although both the methods employed and the data used suffer from a number of deficiencies, the results of these studies point quite consistently to one conclusion; constant marginal cost in the short run is the pattern that best seems to describe actual cost behaviour. For the firms and industries examined, the relationship between total cost and output more often than not appears as linear, implying constant returns to variable input over the normal operating range of output. U-shaped marginal and average cost curves have been found to exist but seem to be less general than commonly thought (68). Table 7.9 summarises the findings of a number of these studies.

Table 7.9 Results of Empirical Studies of Short Run Cost Functions

Name	Type of Industry	Findings
Lester (1946)	Manufacturing	AVC decreases up to capacity levels of output. (AVC = average variable cost).
Hall and Hitch (1939)	Manufacturing	Majority have decreasing marginal costs (MC).
Johnston (1960)	Electricity, Multiple product food processing.	Direct cost is a linear function and MC is constant.

Table 7.9 (Continued)

Name	Type of Industry	Findings
Dean (1936)	Furniture	Constant MC which failed to rise.
Dean (1941)	Leather belts	No significant increase in MC.
Dean (1941)	Hosiery	Constant MC which failed to rise
Dean (1942)	Department Stores	Declining or constant MC depending upon the dept. within the store.
Ezekiel and Wylie (1941)	Steel	Declining MC but large variation.
Yntema (1940)	Steel	Constant MC.
Johnston (1960)	Electricity	AC falls, then flattens, tending towards constant MC to full capacity.
Mansfield and Wein (1958)	Railways	Constant MC.

Source: A. A. Walters, "Production and Cost Functions", Econometrica, Vol. 31, No. 1, (Jan. 1963), pp 1-66.

Despite a lack of empirical confirmation, we can be relatively confident that the closer the firm approaches its short run maximum rate of production, the greater becomes the pressure for rising marginal and average costs. As the firm attempts to squeeze more and more output from its production facilities, a wage premium must be paid for overtime. If second and third shifts are used, the productivity of labour tends to be noticeably lower than on the day shift. Constant use of equipment induces more breakdowns, improper maintenance, and production bottlenecks. Marginal, and perhaps obsolete, pieces of equipment may have to be brought into action to achieve rated capacity. Hiring standards may have to be lowered to obtain the needed labour. A loss of some efficiency accompanied by rises in MC and AC can therefore be expect-

ed at near maximum production rates. Evidence that this is so is furnished by McGraw-Hill Publishing Company's Annual Survey (69) of manufacturing firms.

Among other things, Mcgraw-Hill inquired of manufacturing firms what percentage of their production capacity they are currently using, and at what percentage they would prefer to operate. The preferred rates of operation usually range in the neighbourhood of 90%, which strongly implies belief that the minimum points of their average cost curves are reached at about 90% of the maximum rate of production. Apparently, producing within the 90% to 100% range would entail, as expected, rising marginal and average costs. Then, too, the reason for the failure of empirical studies to detect rising unit costs could well be that the firms and industries examined were for the most part operating short of the output range where their unit cost curves turned upwards.

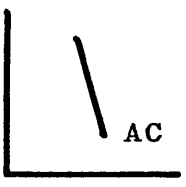
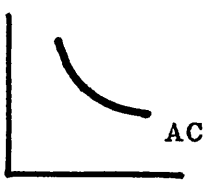
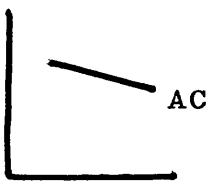
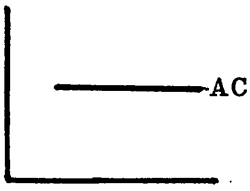
Further evidence of this can be found in the work of Eiteman and Guthrie (70). They set out with the premise that the shape of the average cost curve was important in that it helped to determine price, output, and profit. Moreover, production decisions depended more upon what businessmen <u>thought</u> the shape of the AC curve was, rather than the behaviour of the curve in actuality. A questionnaire was forwarded to 1000 U.S. manufacturing firms in 47 states of sizes between 500 and 5000 employees. Some 334 firms were able to identify one short run average cost curve for their main product from the eight basic shapes provided. About 95% of the 334 firm sample claimed that the AC curve fell throughout the ranges of possible output with existing plant, or that average cost fell rapidly, levelled off, then had a very slight upturn near full capacity. The Eiteman and Guthrie study was of some significance in respect of the Plymouth Survey since

six types of average cost curve were presented to the interviewees who were asked to identify, if possible, the curve which they considered to be applicable to their main product. As price was very much influenced by costs, it seemed important to attempt to identify the various cost curves in operation. It was found that the basic shapes fell into 4 broad categories depending on the degree of production run possible, and the setting-up costs involved.

Table 7.10 Relationship Between Output and Average Costs. Plymouth Survey.

	Production Run Categories			
	"A"	"B"	"C"	"D"
Number of firms.	9	21	22	13
Degree of production run.	Negligible	Restricted	Extended	Continuous
Size of batches.	Small Nil Fractional etc.	Limited Modest Nominal etc.	Long Large Medium etc.	Repeating Very long Routine etc.
Approximate % capacity for routine production.	0%-24%	25%-49%	50%-74%	75%-100%
Type of producer	SPECIALISER e.g. one-off boat design and prod'n. (P18)	DIFFERENTIATOR e.g. aluminium castings (P23)	STANDARDISER e.g. valves and cylinders (P11)	REPEATER e.g. food (P4)

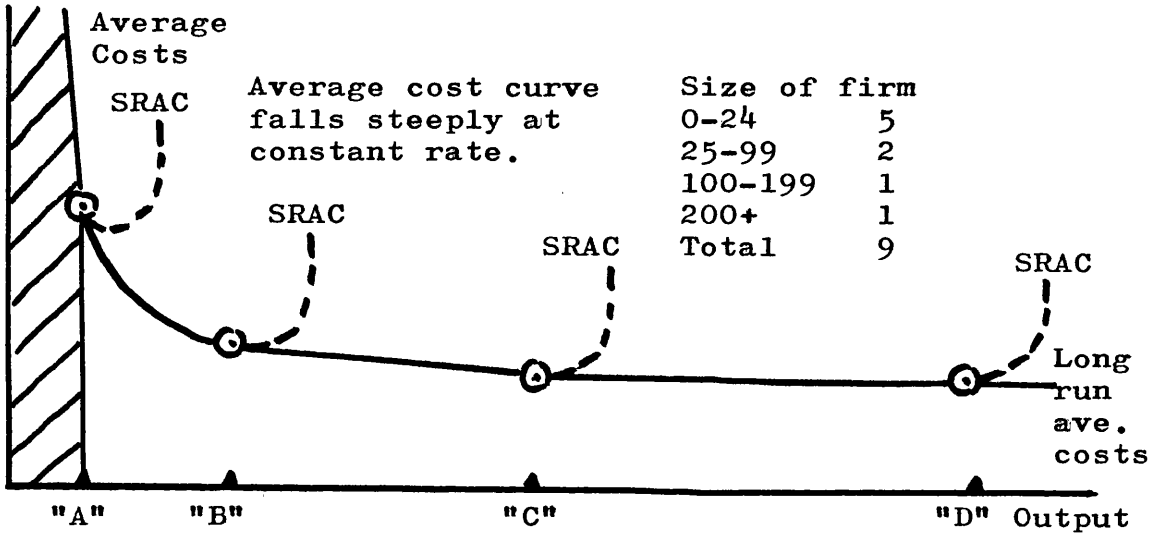
Table 7.10 (Continued)

	Production Run Categories			
	"A"	"B"	"C"	"D"
Type of producer.	Restoration of cracked cylinder blocks. (P21) Custom built paper converting machines. (P25) Diamond Wheels. (P57)	Automatic machine tools. (P14) Air conditioning units. (P34) Books booklets stage scripts (P56)	Sheet metal (P16) Pottery (P46) Joinery tools (P61)	Footwear (P39) Military uniforms (P42) Ready mixed concrete (P59)
i.e.	SPECIALISER	DIFFERENTIATOR	STANDARDISER	REPEATER
Impact of setting-up costs in relation to batch size.	Severe	Significant	Moderate	Marginal
Shape of average cost curve over relevant output range.	Steeply falling at constant rate.	Markedly falling at decreasing rate	Gently falling at constant rate	Almost horizontal
				

Source: Plymouth Survey Questionnaires;
Question 85
Eiteman and Guthrie Survey, American Economic Review, Dec. 1952.

Although no actual cost data could be collected, the general information and comments offered by the Plymouth Survey interviewees strongly suggested that the following average cost curves were likely.

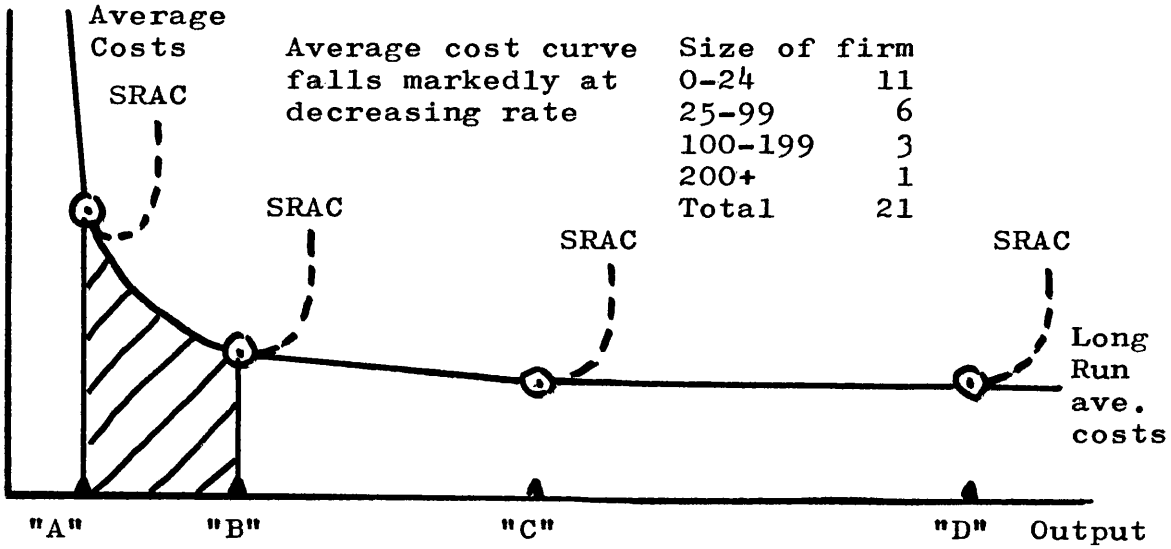
Fig 7.4 Average Cost Curve Under Conditions of Negligible Production Runs. Plymouth Survey. (Cat."A")



Size of firm	
0-24	5
25-99	2
100-199	1
200+	1
Total	9

Source: Plymouth Survey Questionnaires; Question 85

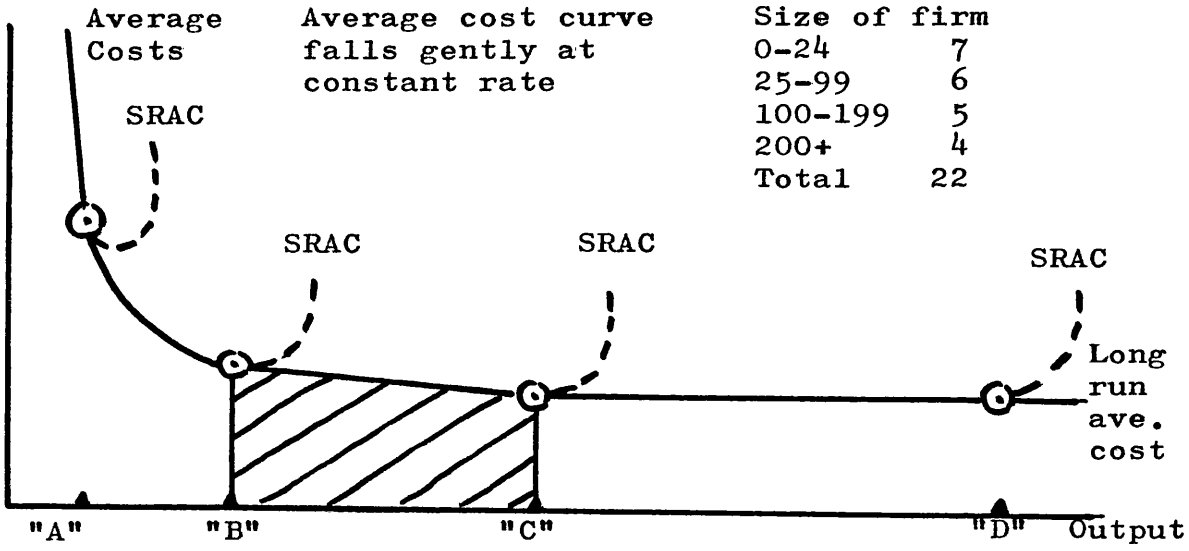
Fig 7.5 Average Cost Curve Under Conditions of Restricted Production Runs. Plymouth Survey. (Cat"B")



Size of firm	
0-24	11
25-99	6
100-199	3
200+	1
Total	21

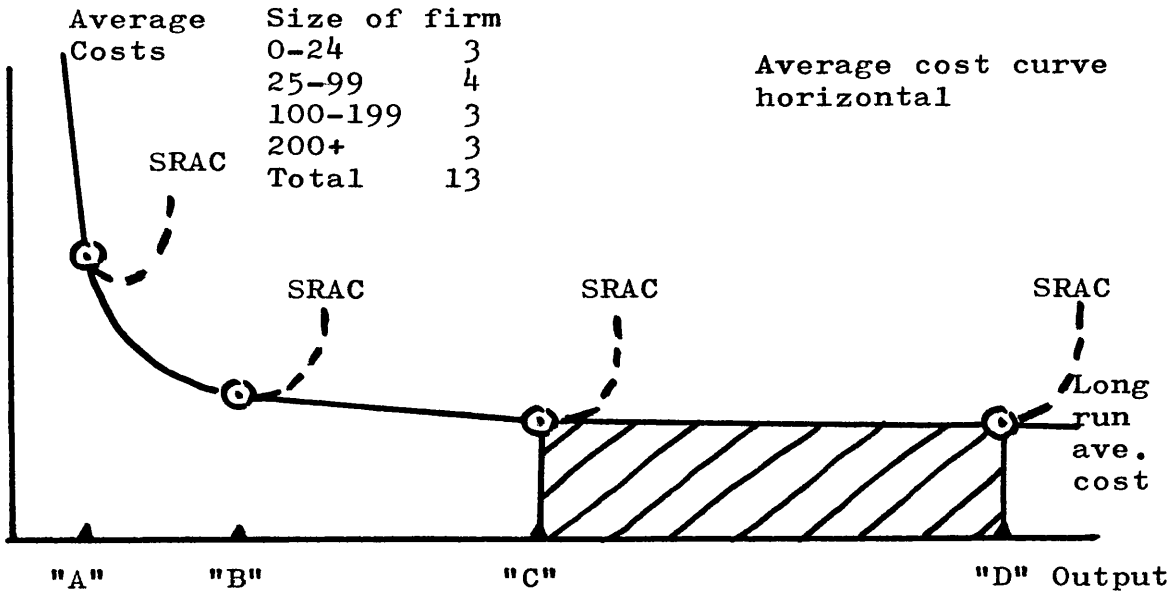
Source: Plymouth Survey Questionnaires; Question 85

Fig 7.6 Average Cost Curve Under Conditions of Extended Production Runs. Plymouth Survey. (Cat."C")



Source: Plymouth Survey Questionnaires; Question 85

Fig 7.7 Average Cost Curve Under Conditions of Continuous Production Runs. Plymouth Survey. (Cat."D")



Source: Plymouth Survey Questionnaires; Question 85

Perhaps the most significant finding to emerge was the fact that all firms appeared to be operating on an L-shaped cost curve, albeit of varying description. No U-shaped curves were apparent, or indeed, reported by the firms. As firms adopted the C+% method of pricing in the main, the shape of the AC curve was clearly relevant. Although some interviewees claimed that they priced according to what the market would bear, the evidence, already presented, was that they were far more influenced by costs of production than by market demand curves. This was demonstrated, for example, by firms admitting that they could raise price marginally, and demand would be unlikely to fall. And even if price were raised significantly, demand would still not necessarily fall for the specialist type of unit; an area to be covered presently. Yet firms preferred to charge prices which covered costs and which they believed would secure and maintain contracts. Additionally, it was discovered that if firms were able to raise output, they would still not necessarily be prepared to lower price. Short run profit was important, but apparently not short run optimum profit. Sales were also vital, but apparently not optimum sales. It seemed clear that firms tended to use the L-shpaed average cost curve more as a "price guide line" rather than any market demand curves which might be estimated. Thus, the shape of the average cost curve was of some importance when pricing decisions had to be made. An L-shape stimulated these decisions, whilst presumably a U-shape would have inhibited activity even more than was apparent in the foregoing chapters.

L-SHAPED COST CURVES AND THE THEORY OF THE FIRM (71)

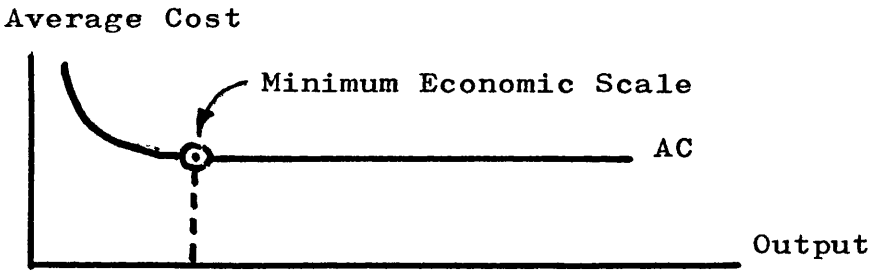
The effect of incorporating "L" rather than U-shaped

average cost curves in the theory of the firm is significant. Perfect competition is seen to be impossible; a horizontal demand curve combined with a flat or falling cost curve gives an explosive situation with no equilibrium output. It is always profitable to expand output and eventually the firm must reach the situation in which it can affect the market price. Once this situation has been reached and the firm is faced by a downward sloping demand curve, we can select the usual equilibrium where marginal cost equals marginal revenue.

Outside perfect competition, one might be tempted therefore to conclude that L-shaped cost curves do not make very much difference; the equilibrium for each firm is the same. But the significant point is that in those industries where economies of scale extend out to very large levels of output, i.e. a falling L-shaped cost curve, the number of firms in the industry will become very small, ultimately perhaps being reduced to only one.

Even in those industries where average costs become constant, there may still be very few firms if, for example, the minimum economic scale of output (Fig 7.8) is large relative to the total market.

Fig 7.8 Minimum Economic Scale of Output



Source: Plymouth Survey Questionnaires; Question 85

L-shaped cost curves lead us, therefore, to expect higher concentration levels than do the U-shaped curves of traditional theory. This expectation is, incidentally, supported by empirical evidence on industrial concentration in Britain, America, and elsewhere, as provided by Utton (72).

Despite controversy about the prevalence of L-shaped long run average cost curves, there is little doubt that they exist in some industries at least up to the levels of output which we have so far achieved. And accepting the possibility of L-shaped long run cost curves, at least for some industries, is an important modification of traditional theory.

Since a detailed examination of this issue is outside the scope of this work, for discussions of the implications for the theory of the firm of long run economies of scale, see, for example, Clark (73), Samuelson (74), Kaldor (75), and Wiles (76). And for the welfare effects of economies of scale on the problem of mergers and monopoly, Williamson (77), and Rowley (78) could be consulted.

On the other hand, the incorporation of a skewed rather than a symmetrical U-shaped short run average cost curve in the theory of the firm presents no particular problems and does not lead to any very significant change in our conclusions. The equality of marginal cost (whatever its shape) and marginal revenue is still a necessary condition for maximising profits.

From the applied point of view in respect of the Plymouth Survey in particular, the main implication of the short run evidence is that firms are likely to be highly concerned with achieving full capacity working so as to minimise production costs. Also implied is the well known phenomenon that after a period of recession, e.g. 1975, and therefore excess capacity, it is usually

found that production costs fall, or stay fairly steady, during the first phase of expansion.

It should be noted, though, that micro-economic cost curves assume constant factor prices, as well as constant technology. A change in these parameters will cause the cost curves to shift. So if wages rise during expansion this will at least partly offset the ceteris paribus fall in production costs as full capacity working is approached.

Micro-cost curves show only the cost of producing various levels of output in the most economic way conceivable with today's technology. They show, in short, the very best that is possible if firms are 100% efficient 100% of the time. The naivity of this assumption has led recently to the development of the concept of X-inefficiency (79) outlined in Chapter 1.

MARKET DEMAND CURVES

Over a period of years it should be possible for the firm to develop fairly accurate cost curves unless there are large elements of uncertainty involved. But even in the latter case the firm might be able to apportion certain costs according to a set formula which may make it possible to draw cost curves in practice even if they are to some extent arbitrary.

The estimation of revenue or demand curves is, however, a much less tractable problem. This is firstly because the level of demand is functionally dependent upon many unquantifiable variables, such as tastes, and secondly because many of the independent variables which determine the level of demand are highly intercorrelated. In other words, demand depends upon, for example, both

the incomes and the tastes of consumers, whilst at the same time tastes are dependent upon incomes. And, of course, demand can depend upon many other factors such as expected income, other prices, credit availability, legislation, advertising, the consumer's age, inflation, and so on. All this implies that the level of demand can only be derived through the solution of a set of simultaneous equations. But even where past data are available, it is not appropriate to employ them for the purpose of demand estimation unless the postulated relationships can reasonably be expected to remain constant over time.

Given the likelihood of errors arising for the reasons outlined above, it is possible in practice to postulate the shape of cost and revenue curves only subject to a certain degree of error. Further analysis of this problem takes us into the area of operations research, and hence lies outside the scope of this work, although it may be worth noting that one of the most important tasks of managers concerned with pricing policy under conditions of imperfect knowledge is to assess the significance for the shape of the demand function of small changes in the value of the independent variables on which it depends - known as sensitivity analysis.

Thus, for optimality the firm needs to know, or estimate, its demand functions for every time period throughout the product's life span. Ignoring uncertainty the firm must then pick that collection of prices through time which will optimise the net present value of its profits. The problem is greatly simplified if the price charged today has no effect on demand in future periods, for then, obviously, it does no harm to optimise profits in the conventional way. But suppose, as seems plausible, that a high price today will inhibit the build-up of sales in future, then goodwill might be lost, and compet-

itors could become more entrenched in the market. In this case, the optimisation of short run profits may harm long run prospects.

It may seem tempting to use the long run demand curve and long run cost curve and derive the optimum from these. But there may be no such thing as a two dimensional long run demand curve according to Clark (80). No doubt, different demand functions for each period could be specifically related to all possible past collections of prices, and the problem, probably via complex mathematical techniques, would be capable of solution, at least in theory. Indeed, a number of attempts have been made to find solutions to the problem - by simplifying it. The very act of simplification is, however, necessarily suspect, since it may radically alter the conclusions. See, for example, Winter and Phelps (81), and Ball (82). Both these approaches make the problem manageable by simplifying the demand side. For example, Ball assumes that competitors' prices are given and do not change, and that industry demand is unaffected by a particular firm's price. He then derives a "dynamic demand function" which shows that the lower the firm's price the higher will be its growth of demand. Although the model is interesting, the use of a single price and single growth rate through time is an abstraction which limits its scope.

It would seem that we need to find out what firms actually do when faced with the problem of demand curves. Evidence, including that from the Plymouth Survey, suggests that they fall back on rule of thumb pricing methods. They take present costs, for example, and use their judgement to add on a margin for profit which makes some allowance, perhaps, for the problems of discouraging new entrants, fostering long run growth of demand, and the

like. For a stimulating and wide ranging discussion of the long run problems of firms, reference to Penrose (83) is recommended.

However, despite the above difficulties associated with the derivation of market demand curves, the Plymouth Survey respondents were invited to estimate the likely shape of their demand curves for the main product. This turned out to be a fairly imprecise operation. Firms had different ideas about demand curves, but after linking the data with the approach adopted for the cost curves, i.e. on an "A", "B", "C", and "D" production run basis purely for ease of presentation, the following results were obtained.

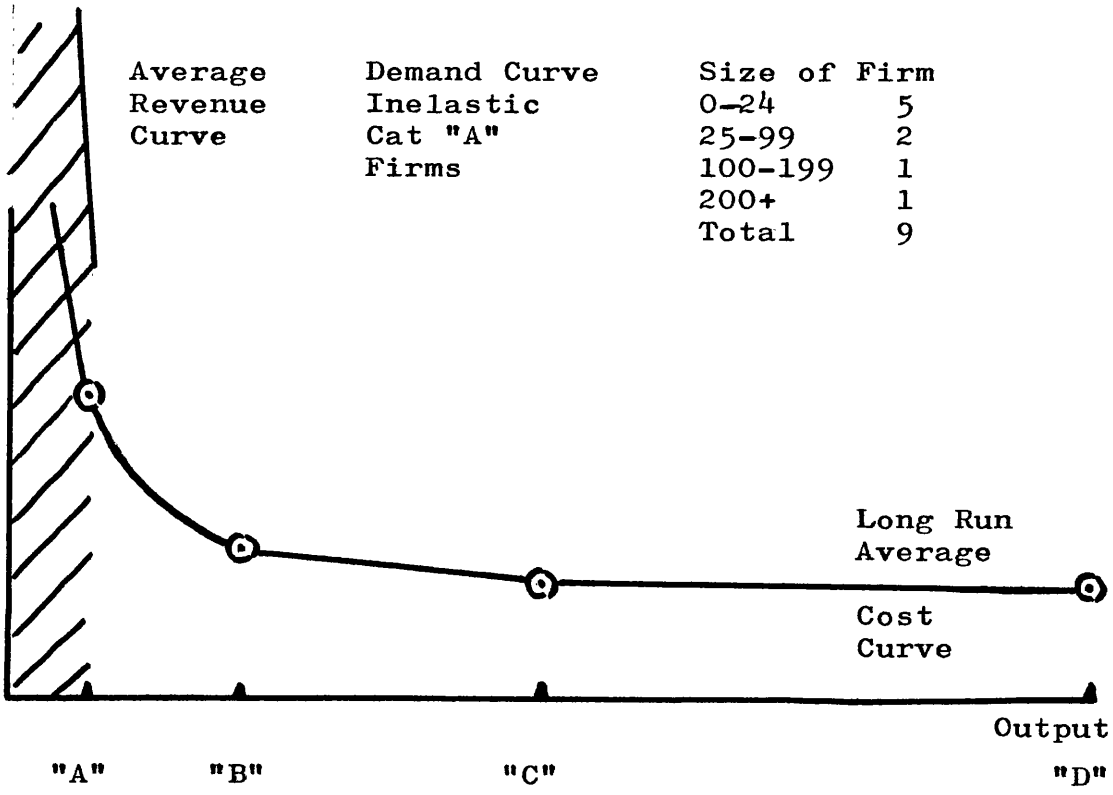
Table 7.11 Market Demand Curves. Plymouth Survey

	Production Run Categories			
	"A"	"B"	"C"	"D"
Number of firms.	9	21	22	13
Degree of prod'n run.	Negligible	Restricted	Extended	Continuous
Type of producer.	SPECIAL-ISER	DIFFER-ENTIATOR	STANDARD-ISER	REPEATER
Size of batches	Nil to small	Nominal to limited	Medium to long	Very long to cont-inuous
Demand.	Inelastic	Fairly inelastic	Fairly elastic	Elastic
Compet-	Marginal Modest Slight Negligible etc.	Moderate Limited Notable Tolerable etc.	Signific-ant. Consider-able. Great Sharp etc.	Severe Serious Fierce Critical etc.

Source: Plymouth Survey Questionnaires; Question 86

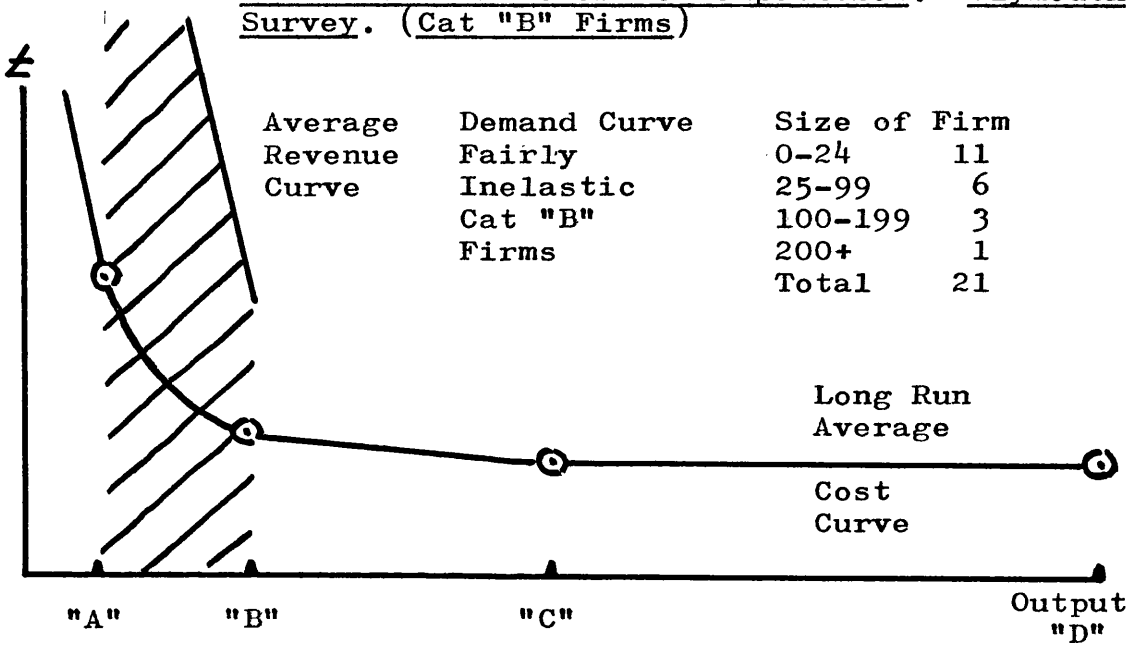
Although no actual market demand data could be collected the general information and comments offered by the interviewees strongly suggested that the following average revenue curves were likely.

Fig 7.9 Market Demand Curve for Main Product Under Conditions of Marginal Competition. Plymouth Survey. (Cat."A" Firms)



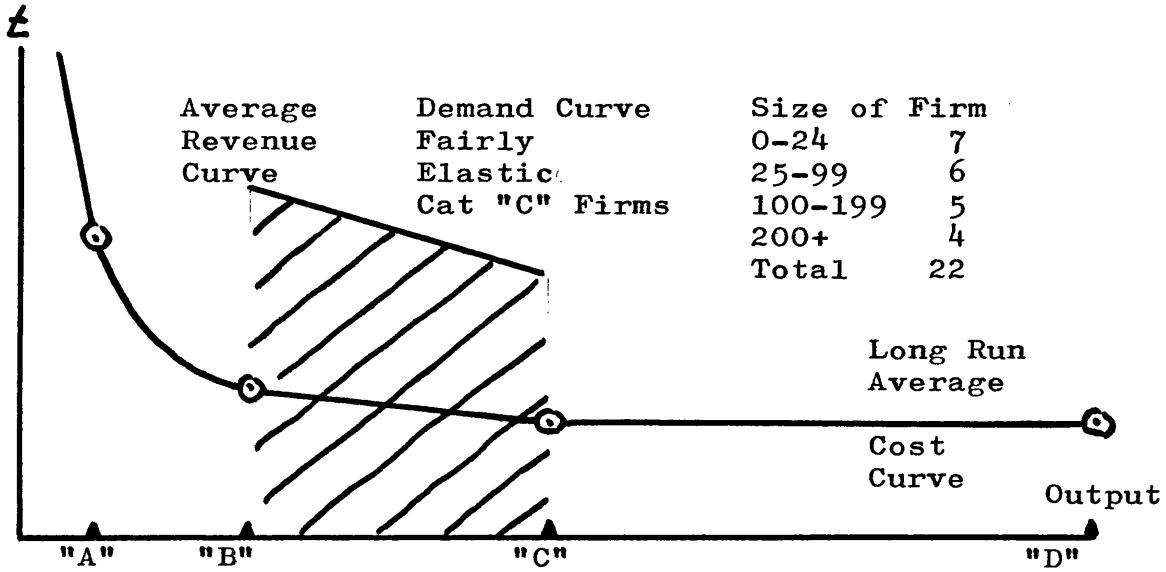
Source: Plymouth Survey Questionnaires; Question 86

Fig 7.10 Market Demand Curve for Main Product Under Conditions of Moderate Competition. Plymouth Survey. (Cat "B" Firms)



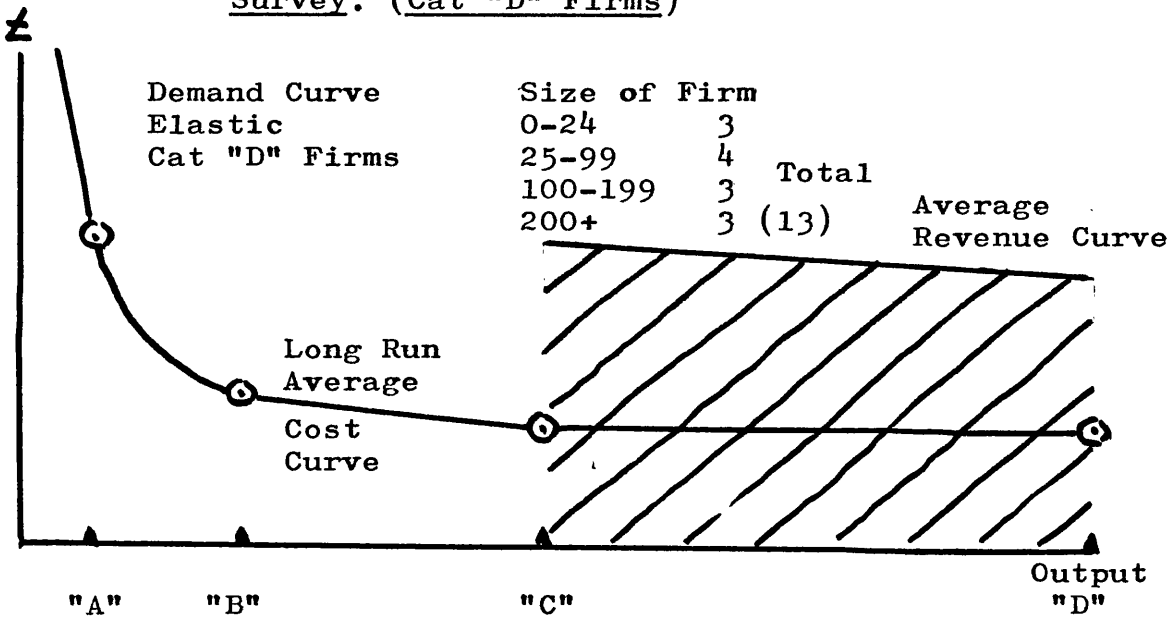
Source: Plymouth Survey Questionnaires; Question 86

Fig 7.11 Market Demand Curve for Main Product Under Conditions of Significant Competition. Plymouth Survey. (Cat "C" Firms)



Source: Plymouth Survey Questionnaires; Question 86

Fig 7.12 Market Demand Curve for Main Product Under Conditions of Severe Competition. Plymouth Survey. (Cat "D" Firms)



Source: Plymouth Survey Questionnaires; Question 86

Pure price taking in the Wiles (84) tradition was not apparent here. Demand curves indicated, for example, that a rise in price would not eliminate demand, although it was true that Category "D" firms would be more adversely affected than Category "A" companies. However, once the relevant output level "A", "B", "C", or "D", had been reached, and although price might be lowered for an extended demand, very few firms in the Plymouth Survey claimed that they would actually lower price, and several reasons were given for this: (i) the cost curve was not judged to be falling sufficiently, e.g. Cats. "C" and "D" firms particularly; (ii) demand would probably only extend marginally at best in the short run, e.g. Cats. "A" and "B" firms particularly; (iii) there was no guarantee that the demand curve and the average cost curve, if they were derived at all, were accurate, constant, and generally

reliable; and (iv) the market would most likely pay the current price at the higher output level.

If then the firms extended their output levels - and this was possible in most cases since they were operating below full capacity - and the market would probably pay the current price, why did the firms not attempt to take advantage of this? Very little market seeking, let alone market research, was apparent as will be demonstrated in Chapter 8. Resignedly, firms appeared to be content with below capacity sales, and sub-optimum profits.

But there was another and far more important reason why firms were not prepared to lower price, and that was bound up in the discovery of a "perpendicular section to the demand curve" at the relevant output level. However, before this aspect can be examined, a brief reference to the Chamberlin (85) model might be helpful.

THE Z-SHAPED DEMAND CURVE

In Chapter 1 it was pointed out that in the past economists had considered the two extremes of perfect competition and monopoly to be adequate tools for analysing any market. In the latter part of the 1920's beginning with an article by an Englishman P. Sraffa (86) attempts were then made to develop models to cope with markets between these extremes. This activity stimulated two important pieces of work in the early 1930's; Joan Robinson's "Imperfect Competition" (87), and Edward Chamberlin's "Monopolistic Competition" (88).

Monopolistic competition is, of course, a market structure in which there are many small firms selling products which are close but not perfect substitutes for

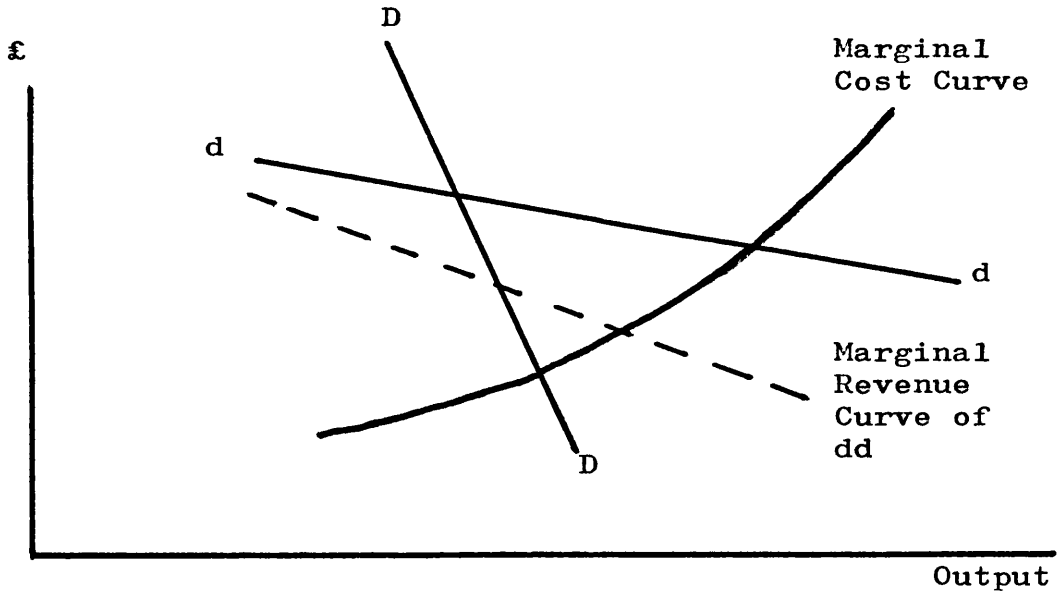
each other. This type of market structure combines the characteristics of perfect competition and monopoly. Chamberlin defined product differentiation as follows: "A general class of product is differentiated if any significant basis exists for distinguishing the goods of one seller from those of another. Such a basis may be real or fancied so long as it is of any importance whatever to buyers and leads to a preference for one variety of the product over another. Differentiation may be based upon certain certain characteristics of the product itself such as exclusive patented features, trade marks, trade names, peculiarities of the package or containers, if any, or singularity of design, quality, colour, or style. It may also exist with respect to the conditions surrounding its sale" (89). Since the firms used in the Plymouth Survey corresponded with this definition, the Chamberlin model was considered to be more relevant than the Robinson.

Monopolistic competition also implies that each seller is small enough so that no one either presently supplies, or has the capacity to supply, a significant proportion of the total market. This means that each seller will pursue independent policies with respect to pricing, advertising (if any) and product variation with any explicit regard for the behaviour of his competitors, and without any concern for retaliatory measures from his competitors. Chamberlin said that "any adjustment of price by a single producer spreads its influence over so many of his competitors that the impact felt by any one is negligible and does not lead him to any re-adjustment of his own position. A price cut, for instance, which increases the sales of he who made it, draws inappreciable amounts from the markets of each of his many competitors achieving a benefit for the one who cut, but without

making incursions upon the market of any single competitor sufficient to cause him to do anything he would not have done anyway" (90).

Chamberlin used two different demand curves in his model.

Fig 7.13 Chamberlin's Use of Two Demand Curves for Monopolistic Competition

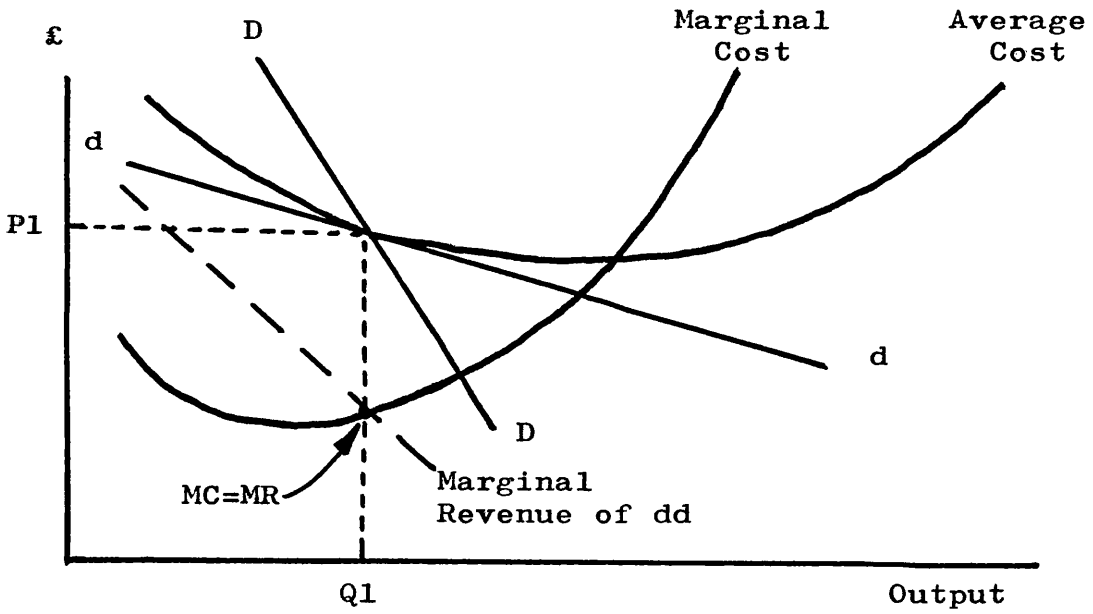


Source: E. H. Chamberlin, "The Theory of Monopolistic Competition", Macmillan, London, 1933.

DD is based on the assumption that competitors' prices are always the same as the prices of the firm being analysed. The second dd is based on the assumption that competitors' prices remain fixed - a more likely proposition at least as far as the Plymouth Survey is concerned. Thus, DD shows the quantity that will be purchased at each price from the firm when its price is always matched by its competitors. The other curve dd shows the amount that will be purchased at each price from the firm when the firm's price is either lower or higher

than its competitors except for the price at the intersection. If the firm in question changes its price and its competitors do not, then dd is the relevant curve. On the other hand, if competitors do change price then DD is the relevant curve. Chamberlin showed that the long run equilibrium position would be as Fig 7.14 below.

Fig 7.14 Chamberlin's Long Run Equilibrium Position for the Firm in Monopolistic Competition



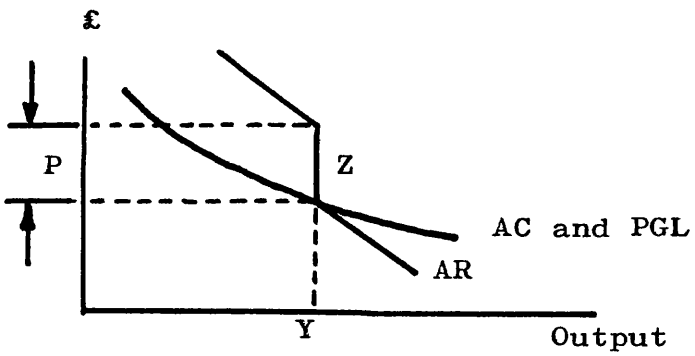
Source: E. H. Chamberlin, "The Theory of Monopolistic Competition", Macmillan, London, 1933.

Long run cost curves are used and the LRAC curve is tangential to the dd curve at output Q1 and price P1 giving normal profit where the DD and dd curves intersect, along with the MC=MR position. This means that the entry of new firms, or the exit of existing ones, may be necessary before the long run equilibrium position is obtained since this is the way in which the DD curve is moved.

Two points are of particular interest in the model. Firstly, the application of demand curves DD or dd depends upon whether competitors react to changes in price or not. But in the Plymouth Survey four categories of firm were apparent, i.e. "A", "B", "C", and "D". Firms in category "A", for example, engaged in specialist work had little direct competition as such, and dd would be the correct demand curve. On the other hand, for firms in category "D" on routine production and faced with severe competition, DD would be the relevant curve. Chamberlin does not take this into account.

Secondly, Chamberlin assumes that every price change will induce a change in demand. Hence, the negatively sloped average revenue curve, whether DD or dd. But the Plymouth Survey revealed that whilst a significant raising of price would certainly contract demand, a marginal increase would not. Similarly, a marked lowering of price would extend demand, but a nominal decrease would not. Thus the demand curve clearly possessed a perfectly inelastic section at the relevant output level. In other words, the average revenue curve was roughly "Z-shaped" as shown in Fig 7.15 and as elaborated by the extracts which follow.

Fig 7.15 The Z-Shaped Demand Curve



AR = demand curve with inelastic section
AC = average cost curve
PGL = price guide line
Y = relevant output level
P = price possibilities above AC but below the upper limit
Z = inelastic section

Source: Plymouth Survey Questionnaires; Question 87

"A 1p on the price would have no effect, but 3p would reduce demand significantly. For example, a 1% change in price would have a 0% change in demand, but a 20% price change would cause a 100% fall in demand over the long and short runs". (Code P1; Employees; 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 87)

"If price were raised by a large amount then demand would fall even in the short run, but would probably revive or re-adjust in the long run. On the other hand, if price were raised by a small amount then there would probably be no change at all in sales. For example, 1% change in price = 0% change in demand; 10% change in price = 20% change in demand (short run) and 40% change in demand (long run)". (P2; 95; D; FDT; Brewing; PSQ,Q87).

"A price change of 1% would not reduce demand either in the short run or long run, but a 5% or 10% change in price could be significant". (P3; 50; C; FDT; Confectionery; PSQ,Q87).

"A 1% rise in price would have a nil effect on immediate demand, whereas 10% would cause 50% of our customers to find alternatives". (P4; 600; D; FDT; Baby Food; PSQ,Q87).

"The effect of a rise in price upon demand depends on seasonal factors, the conditions of the market, etc. Assuming normal conditions a very small price change would have no effect on demand but there would be some reaction if the change were large. For example, 1% change in price = 0% change in demand; 20% change in price = 90% change in demand (short run) and 100% change in demand (long run)". (P6; 450; D; FDT; Meat; PSQ,Q87).

"Normally the response of demand to any change in price would be notable but in the short run we could raise price marginally and survive. For example, 5% change in price = 0% change in demand (short run) and 1% change in demand (long run)". (P7; 20; C; FDT; Minerals; PSQ,Q87).

"If the bread subsidy were removed and we charged an economic price then demand would probably fall by about 15% but would recover over the longer term. For example, 1% change in price = 0% change in demand; 5% change in price = 10% change in demand (short run) and 22½% change in demand (long run)". (P8; 300; C; FDT; Bread; PSQ,Q87).

"The customer would pay a small price increase but we would lose some business if we tried to charge a price higher than that set by the market. For example, 1% change in price = 0% change in demand; 10% change in price = 50% change in demand (short run) and 100% change in demand (long run)". (P9; 15; D; CAI; Fertiliser; PSQ,Q87).

"Demand would not be affected by a small change in price in the short run, but reaction would be more severe long term. For example, 1% change in price = 0% change in demand; 20% change in price = 60% change in demand (short run) and 80% change in demand (long run)". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q87).

"Demand would be affected by any large price change particularly in the long run. For example, 1% change in price = 0% change in demand; 10% change in price = 15% change in demand (short run) and 25% change in demand (long run)". (P12; 8; C; MME; Injection Moulds; PSQ,Q87).

"A 1% change in price would probably have no effect on sales both in the short and long runs, but anything over 1% would promote a reaction". (P13; 170; B; MME; Steelwork; PSQ,Q87).

"The response of demand to a 1% change in price would probably be zero, but a 10% change in price might contract sales by 20% (short run) and as much as 50% (long run)". (P14; 468; B; MME; Machine Tools; PSQ,Q87).

"Currently we are in a competitive position - a major aim of the firm. But in any event a 1% change in price would very likely have little or no effect on sales". (P15; 14; B; MME; Industrial Signs; PSQ,Q87).

"Generally, it pays to put prices up slightly and often rather than maintain stable prices with the occasional sharp increase". (P16; 10; C; MME; Press Tools; PSQ,Q87).

"A price rise of, say, 1% would have no effect on demand over the short run or even long run. A 5% price change, however, would probably reduce demand by 10% (short run) and perhaps 20% (long run)". (P17; 90; C; MME; Packaging Machinery; PSQ,Q87).

"Recently, we put our prices up by 5% and had two boat orders cancelled, which amounted to a fall of 14%

in overall demand. It is likely that if the increase had been below 5% we would have maintained our order books". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q87).

"A 1% change in price would have a nil effect on demand but a 5% change might cause sales to fall by $2\frac{1}{2}$% (short run) and 5% (long run)". (P19; 60; B; MME; Boats; PSQ,Q87).

"Our nearest rivals are Coldlock Ltd. , Cardiff, and Casting Repairs Ltd., South Wales, who in any event perform a rougher type of repair. Thus, there is no competition at all in the area, and consequently small changes in price would have very little effect on demand". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q87).

"We would estimate that whilst a 10% change in price would induce a 10% fall in demand (short run) and 20% (long run), a 1% change in price would leave sales unchanged". (P23; 50; B; MME; Iron Castings; PSQ,Q87).

"If price were raised by between 1% and 5% demand would fall by between 0% and $2\frac{1}{2}$% only. But an increase in price of, say, 20% could lose us 75% of sales long run". (P26; 70; A; MME; Trawler Repairs; PSQ,Q87).

"Demand would not be affected by a price change of, say, 1%. Larger price changes would obviously influence customers to look elsewhere". (P28; 4; B; MME; Aluminium Castings; PSQ,Q87).

"If price rose by 10% then we could lose up to $33\frac{1}{3}$% of sales long run. However, a 1% change in price would simply be absorbed by the customer". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q87).

"Some work would be lost if prices were increased by a fairly large amount, e.g. 10%. But a 1% change in price would probably be accepted by the market". (P31; 50; B; MME; Steelwork; PSQ,Q87).

"There would be no customer response to a negligible increase in price". (P33; 3; A; MME; Luxury Yachts; PSQ,Q87).

"A 10% price increase might lose some orders especially if they were local ones, but a 50% price rise would eliminate demand completely". (P34; 20; B; EE; Cold Rooms; PSQ,Q87).

"Business would be lost in the long run if prices were raised although much of the work might be retained in the short run. A 1% change in price would be too small to affect sales significantly". (P35; 20; B; EE; Electric Motors; PSQ,Q87).

"Demand would certainly fall if the price increase were a notable one, since our customers do tend to know what a "fair price" is. We would, in fact, go out of business if prices were raised 20% above our competitors. But a 1% price rise would probably be acceptable". (P37; 27; C; EE; Location Systems; PSQ,Q87).

"In our present position where price is already as high as it can be, demand would certainly be affected if price were raised at all. However, perhaps a 1% increase might be absorbed". (P38; 8; B; EE; Control Panels; PSQ,Q87).

"Small price changes would have no effect on marginal or standard demand. If the price changes were large, e.g. 10% then the marginal sales would fall by 30% (short run) and 80% (long run), whilst much of the standard demand might be retained". (P39; 800; D; TLCF; Footwear; PSQ,Q87).

"A 1% change in price would not reduce demand at all but a 5% change might cause sales to fall by 5% (short run) and by 10% (long run). A 20% increase in price could eliminate demand totally". (P41; 150; C; TLCF; Clothing; PSQ,Q87).

"All prices have to be negotiated with the relevant government department, but one could assume that a 1% price increase would not be questioned as rigorously as, say, a 5% or 10% rise". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q87).

"Assuming that our rivals retained their prices then a 1% increase in price would have a nil effect on demand, but a 5% change might reduce sales by as much as 25% (short run) and $33\frac{1}{3}\%$ (long run)". (P43; 13; C; TLCF; Wet Suits; PSQ,Q87).

"Taking current trade conditions, a 5% price rise would reduce demand by about 10% (short run) and $12\frac{1}{2}\%$ (long run), whilst a 10% price change might cause sales to fall by 50% (short run) and up to 100% (long run). These results could be rather less severe under normal economic conditions. But in any event, a 1% price rise

would have no effect at all on demand". (P44; 45; D; BPG; Glass; PSQ,Q87).

"Provided that the price increase was small we would retain a good deal of work since price is already competitively low and stable. A 1% price rise would have zero effect on demand". (P45; 23; C; BPG; Pottery; PSQ,Q87).

"A price increase would reduce sales but not significantly unless the price rise was severe". (P46; 140; C; BPG; Pottery; PSQ,Q87).

"Specialist work would be retained if prices were increased. Routine items might be more drastically affected, e.g. 1% change in price = 0% change in demand; 5% change in price = $2\frac{1}{2}$% change in demand (short run) and 5% change in demand (long run); 10% change in price = 10% change in demand (short run) and 20% change in demand (long run)". (P47; 13; B; BPG; Pottery; PSQ,Q87).

"Very small changes in price would have little impact on demand but severe price rises might cause customers to go nationwide". (P48; 25; C; OMG; Furniture; PSQ,Q87).

"The industry is quite competitive and although a 1% price rise would have no effect on demand, a 5% increase would contract sales by at least 5% (short run) and up to 10% (long run)". (P49; 19; B; OMG; Blinds; PSQ,Q87).

"A price increase of 20% could reduce demand to zero even in the short run. But a 1% price rise would probably be accepted". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q87).

"Price increases would probably affect our longer runs rather more than the shorter ones. But assuming the longer runs, a 1% price rise would have a nil effect on demand whilst a 10% increase would reduce sales by 20% (short run) and $33\frac{1}{3}$% (long run). On the shorter runs it would be possible for the customer to pay up and pass the increase on since it is accepted that the specialised lines do have wider price bands". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q87).

"Since competition is severe the estimated response of demand to a 10% increase in price would be $33\frac{1}{3}$% (short run) and 75% (long run). However, a 1% price rise

would probably have a negligible effect on sales". (P52; 22; D; OMG; Coffins; PSQ,Q87).

"Very small price increases would have a nominal effect only on demand, but a 20% rise might reduce sales by 40% (short run) and up to 50% (long run)". (P54; 24; B; OMG; Printing; PSQ,Q87).

"Although a 1% price rise would have a zero effect on sales, a 20% increase might eliminate demand completely even in the short run. Pricing must be geared to the customer". (P55; 25; A; OMG; Vehicles; PSQ,Q87).

"Small price increases would probably retain demand but large rises would not, e.g. a 10% price increase could lose 12½% of sales over the longer term". (P56; 50; B; OMG; Printing; PSQ,Q87).

"Reaction of demand to changes in price depends to a large extent upon prevailing economic conditions, but a 1% price rise would not affect demand at all, whilst a 10% increase could reduce sales by 50% (short run) and up to 90% (long run)". (P59; 175; D; OMG; Concrete; PSQ,Q87).

"Normally, there would be no loss of demand from a 1% price rise, but a 20% increase could induce a critical fall in sales, e.g. 80% in the long run". (P62; 400; C; OMG; Business Systems; PSQ,Q87).

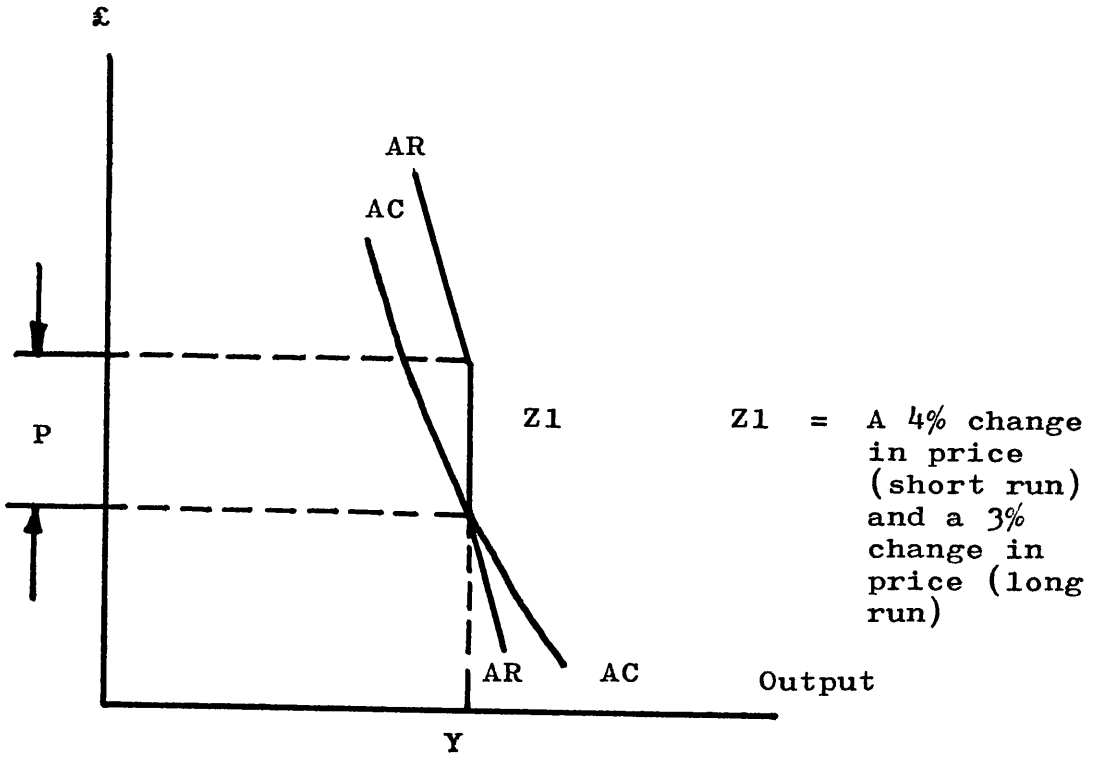
"Small and frequent price increases are always to be preferred to large price rises over longer periods of time". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q87).

"The marginal customer would probably pay an extra 1% if he had too, but he would be likely to reject anything above this figure". (P65; 30; B; OMG; Tents; PSQ, Q87).

Thus, the "Z-shaped" demand curve was confirmed. Firms themselves admitted that price could be raised and no sales would be lost. Why did firms <u>not</u> take advantage of this? Clearly, if they did not, then revenue would be lost, profits would be lower than the attainable, and returns on net assets would be below optimum.

The actual shape of the demand curve, as indicated earlier, depends upon the category of firm under review, i.e. production runs "A", "B", "C", or "D". But if the inelastic section "Z" is incorporated, then an amendment is necessary as shown below.

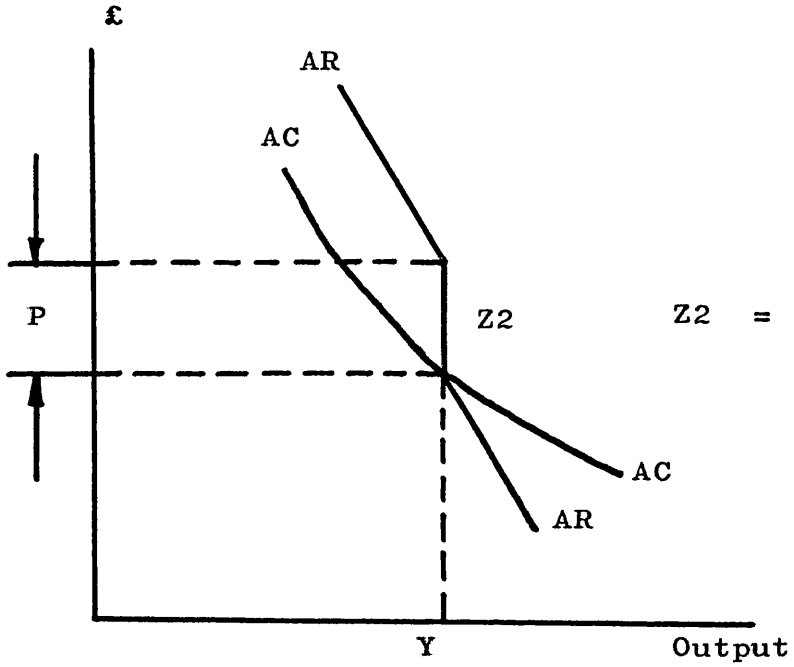
Fig 7.16 Demand Curve with Inelastic Section for Category "A" Firms. Plymouth Survey



AR = Average revenue curve
AC = Average cost curve
Y = Output level
P = Price possibilities at output level Y
Z1 = Inelastic section

Source: Plymouth Survey Questionnaires; Question 87

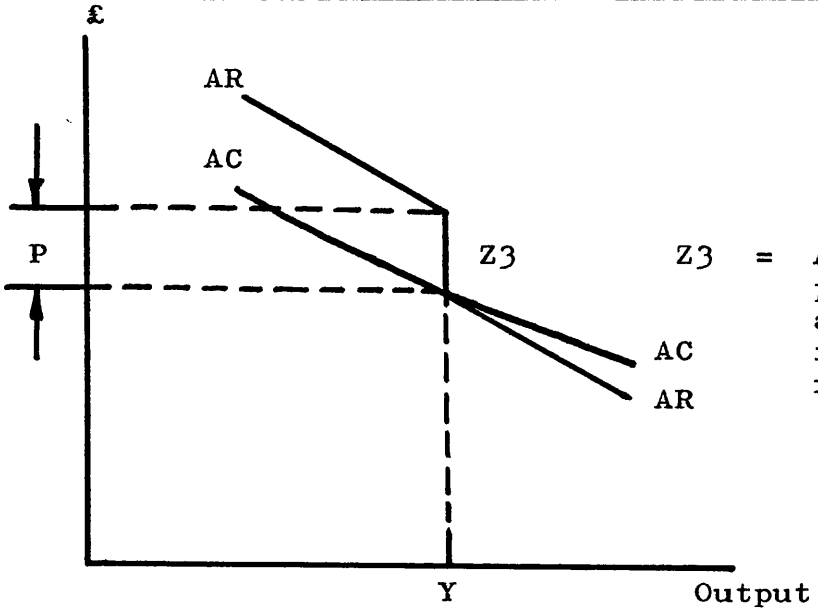
Fig 7.17 Demand Curve with Inelastic Section for Category "B" Firms. Plymouth Survey



Z2 = A 3% change in price (short run) and a $2\frac{1}{2}$% change in price (long run)

Source: Plymouth Survey Questionnaires; Question 87

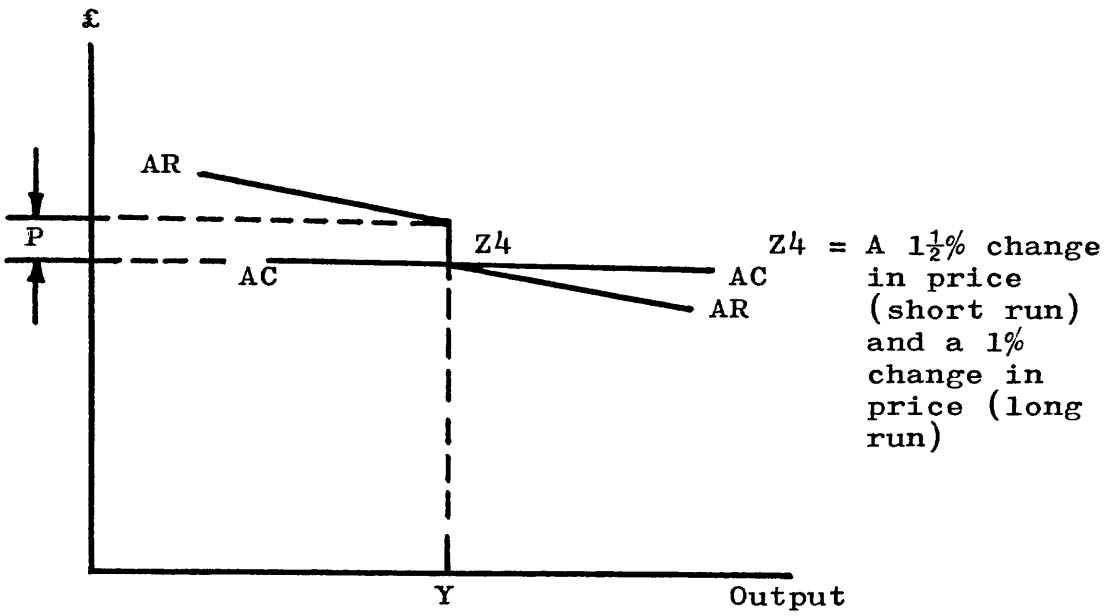
Fig 7.18 Demand Curve with Inelastic Section for Category "C" Firms. Plymouth Survey



Z3 = A $2\frac{1}{2}$% change in price (short run) and a $1\frac{1}{2}$% change in price (long run)

Source: Plymouth Survey Questionnaires; Question 87

Fig 7.19 Demand Curve with Inelastic Section for Category "D" Firms. Plymouth Survey

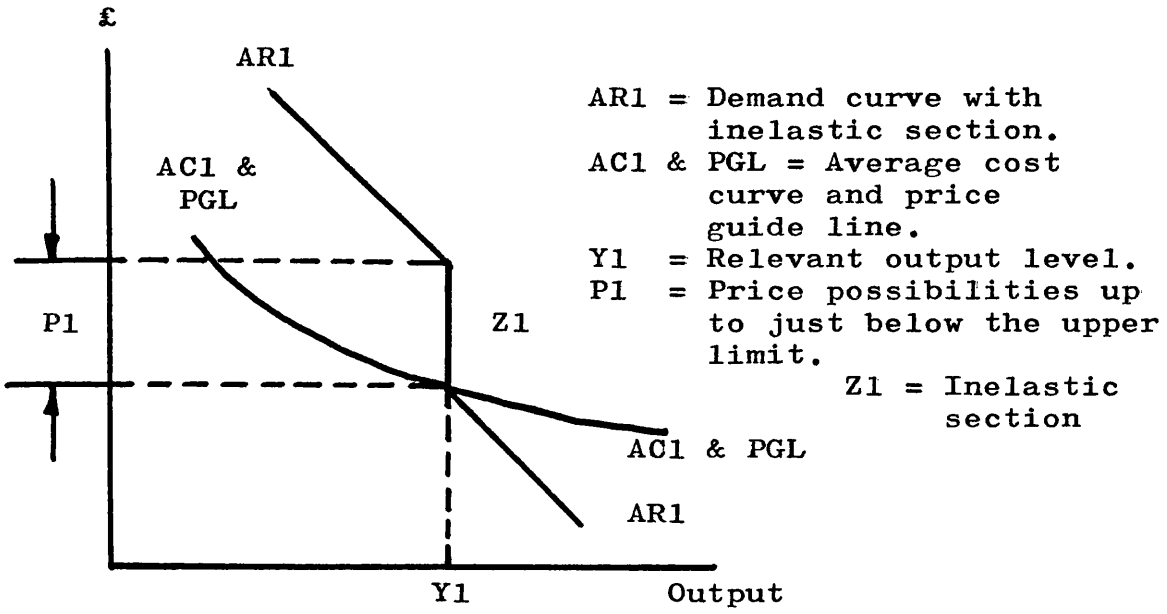


Source: Plymouth Survey Questionnaires; Question 87

It should be noted that the "Z" area percentages have been estimated by interpolation and are explained presently in Figures 7.25 and 7.26.

It should also be emphasised that when price increases are discussed, we are referring to economic price increases and not inflationary ones. Obviously, all firms would have to resort to price adjustments in order to counter inflation from time to time, but it appeared that very few firms were prepared to raise price to the point which they themselves knew to be more profitable than any other. Indeed, the "Z area" persisted even at different price and output levels. Consider the following initial position.

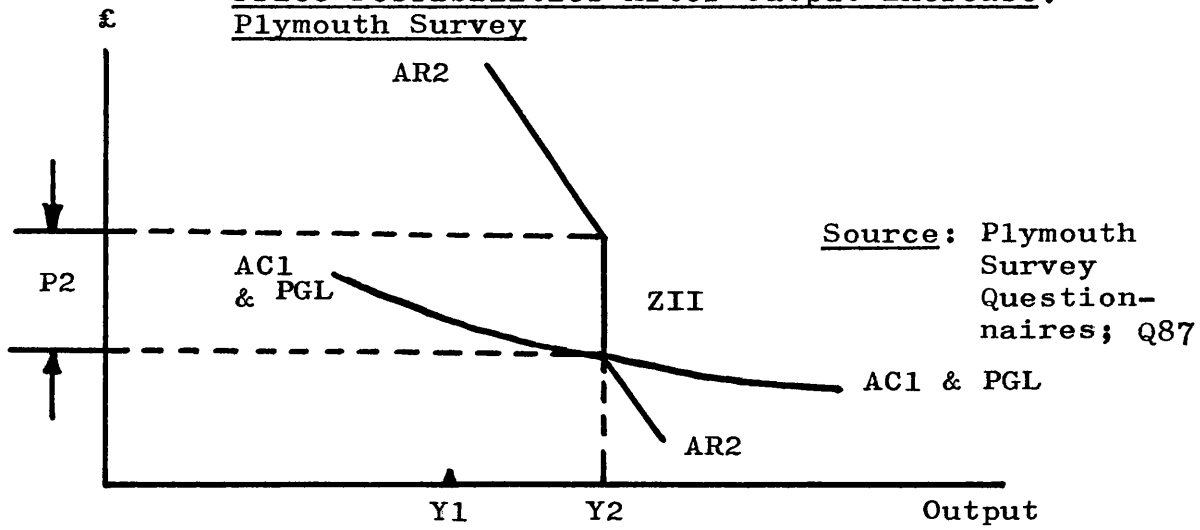
Fig 7.20 Demand Curve with Inelastic Section Giving Price Possibilities. Plymouth Survey



Source: Plymouth Survey Questionnaires; Question 87

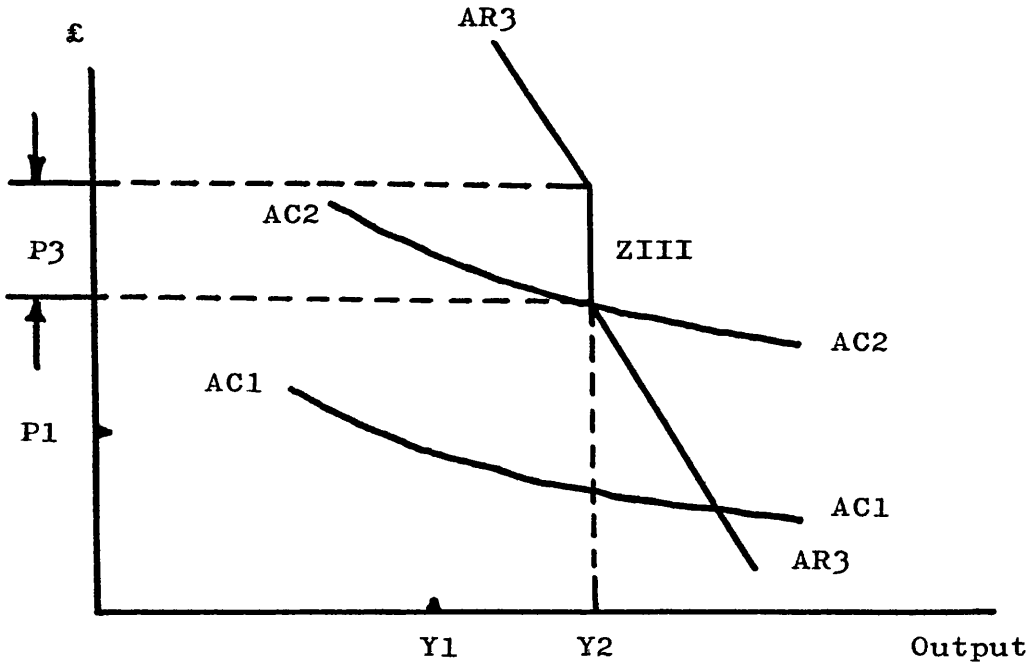
Consider now an output increase from Y1 to Y2 as a result of general expansion over time. AR1 moves rightwards to AR2, but the firm still operates on the vertical section ZII on the demand curve.

Fig 7.21 Demand Curve with Inelastic Section Giving Price Possibilities After Output Increase. Plymouth Survey



Assume now that prices rise due to inflation. Output remains static, but the average cost curve moves upwards, and the demand curve goes with it, the firm still pricing according to the perpendicular section, i.e. ZIII.

Fig 7.22 Demand Curve with Inelastic Section Giving Price Possibilities After Output Increase and Inflation. Plymouth Survey



Source: Plymouth Survey Questionnaires; Question 87

The derivation of the marginal and total revenue schedules from the Z-shaped demand curve involves a process similar to that employed for the kinked demand curve in oligopoly. The Z-shaped curve consists of two separate demand schedules but with a vertical connecting section. Therefore, the marginal revenue curve must also consist of two parts, but with a discontinuous area between them. A simple tabular example of this is given.

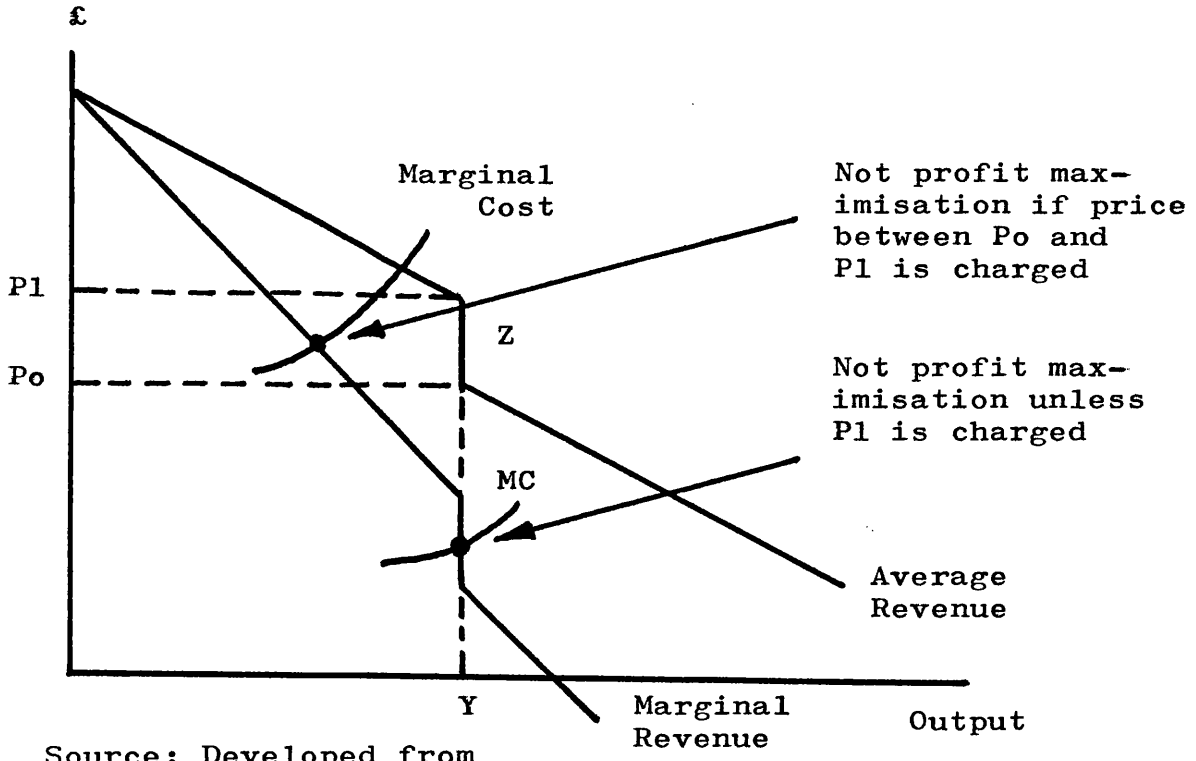
Table 7.12 Derivation of the Marginal Revenue Curve from the Z-Shaped Demand Curve.

Output	Average Revenue	Total Revenue	Marginal Revenue
1	9	9	9
2	8	16	7
3	7	21	5
4	6	24	3
4	5		
4	4	16	
5	3	15	-1
6	2	12	-3
7	1	7	-5

Source: Developed from Plymouth Survey Questionnaires; Question 87

And graphically:

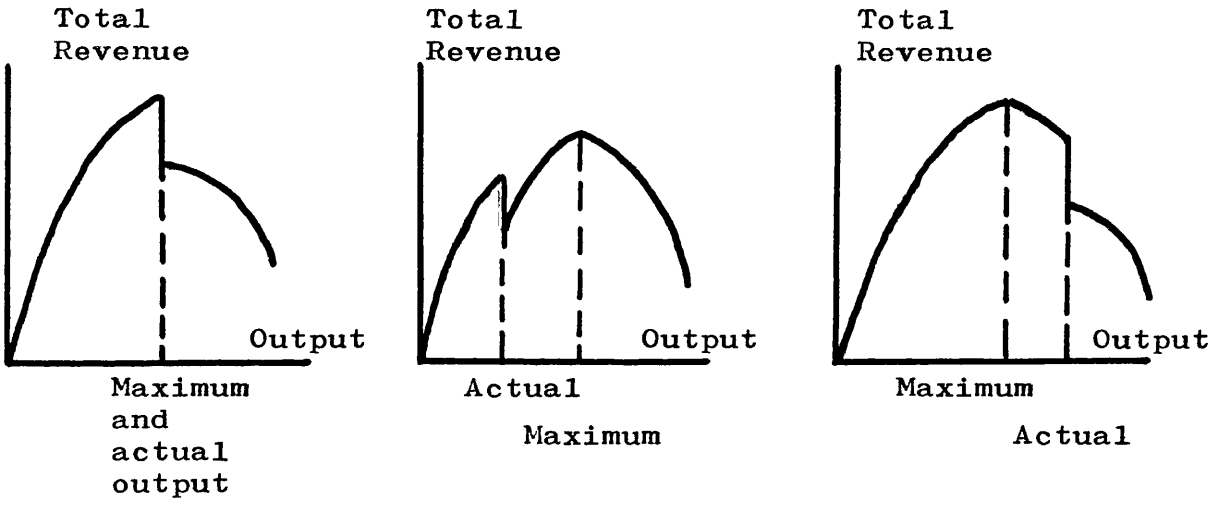
Fig 7.23 Derivation of the Marginal Revenue Curve from the Z-Shaped Demand Curve.



Source: Developed from Plymouth Survey Questionnaires; Question 87

The total revenue curve might assume any one of the following three possibilities:

Fig 7.24 Total Revenue Curve where Maximum Revenue Output is Equal to; is Greater than; and is Less than the Actual Output.



Source: Developed from Plymouth Survey Questionnaires; Question 87

Measurement of the "Z area" was considered to be important, and the actual responses of demand to various changes in demand were estimated by the firms themselves to be as follows:

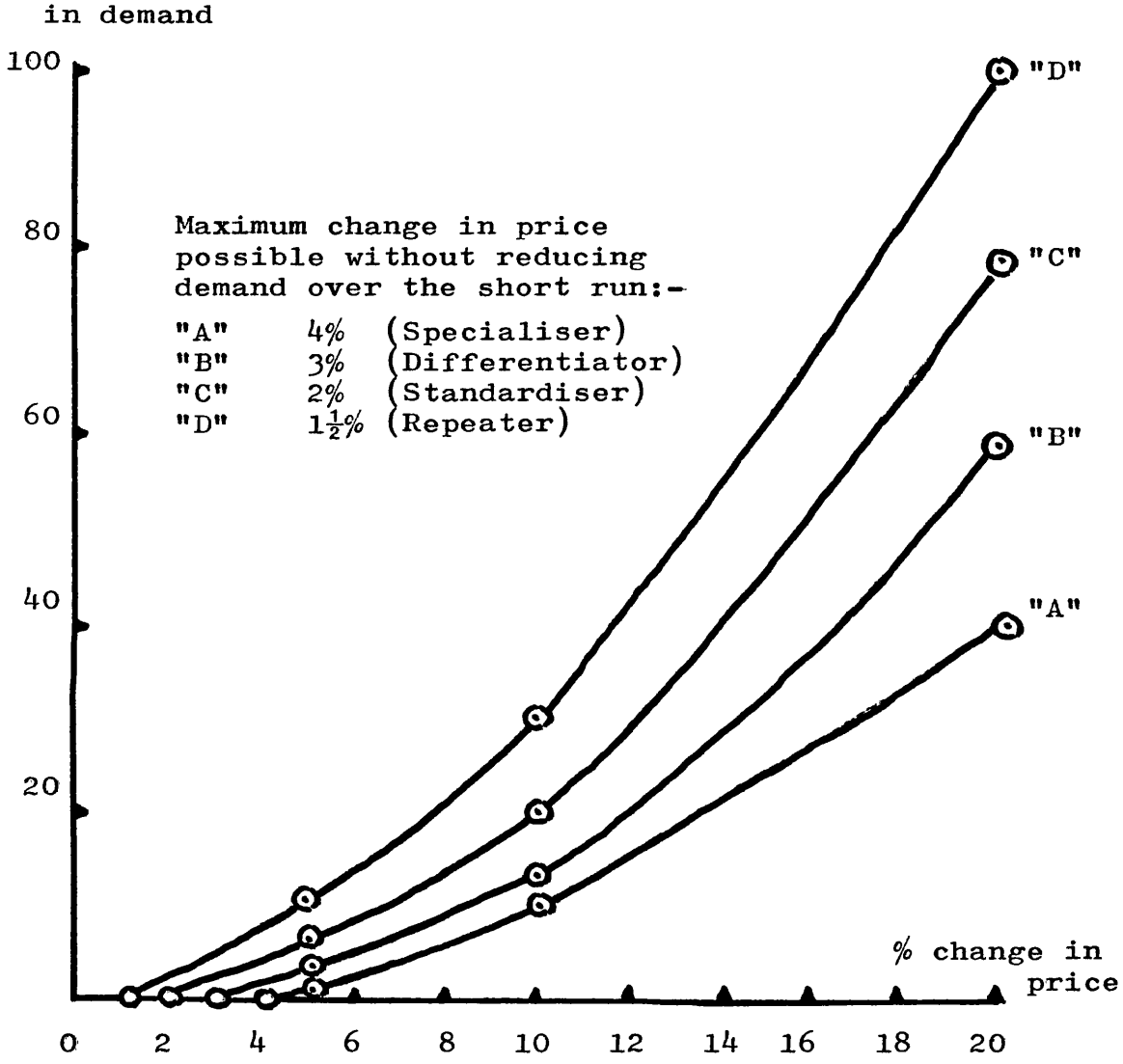
Table 7.13 Average Responses of Demand to Changes in Price over the Short Run. Plymouth Survey

	% Changes in Price				
	1%	2½%	5%	10%	20%
Cat. "A"	0%	0%	½%	10%	40%
Cat. "B"	0%	0%	2½%	12½%	60%
Cat. "C"	0%	½%	5%	20%	90%
Cat. "D"	0%	2½%	10%	30%	100%

Source: Plymouth Survey Questionnaires; Question 87

Graphically:

Fig 7.25 Average Responses of Demand to Changes in Price Over the Short Run Indicating the Maxmimum Change in Price Possible Without Reducing Demand. Plymouth Survey



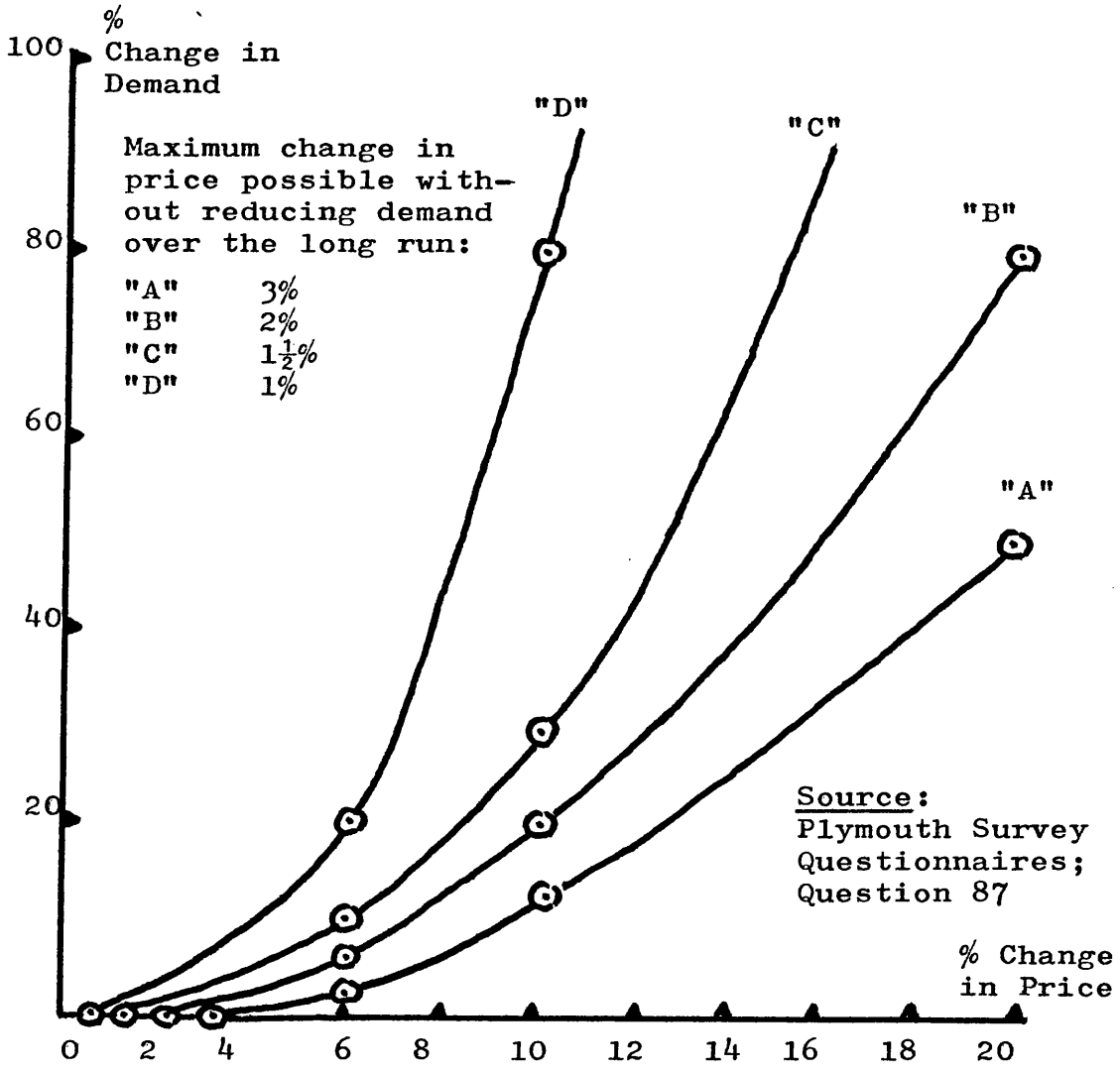
Source: Plymouth Survey Questionnaires; Question 87

Table 7.14 Average Responses of Demand to Changes in Price Over the Long Run. Plymouth Survey

	% Changes in Price				
	1%	2½%	5%	10%	20%
Cat. "A"	0%	0%	2%	12½%	50%
Cat. "B"	0%	½%	5%	20%	80%
Cat. "C"	0%	2½%	10%	30%	100%
Cat. "D"	0%	5%	20%	80%	100%

Source: Plymouth Survey Questionnaires; Question 87

Fig 7.26 Average Responses of Demand to Changes in Price Over the Long Run Indicating the Maximum Change in Price Possible Without Reducing Demand. Plymouth Survey



The results clearly suggest that prices could have been raised by 4%, 3%, 2%, or 1%, depending on the category of firm, over the short run, without any reduction in demand. And even over the long term, prices could have been increased by approximately 3%, 2%, $1\frac{1}{2}$%, or 1%, and revenue would have increased.

The finding that the demand curve possessed a vertical section was considered to be important. If firms knew that by raising price demand would not be reduced, the question remains, why did they not elect to increase profit by this means? As long as firms retained their price, they could not possibly be optimising profit at the relevant output level. And even if price were raised to the higher limit of the "Z" section, it has already been put forward that the demand curve would move en bloc upwards to a new position. Thus, the increased price would merely become a price below the higher limit with profit optimisation, again, not being achieved.

Similarly, firms knew that a marginal reduction in price would also have a nil effect on demand. This finding slightly conflicted with the Chamberlin (91) theory. Chamberlin claimed that if firms reduced price they could gain an insignificant market share from each rival. But the sum total market share for the price reducing firm would be considerable. In the real world, this assumption must be questioned, and especially if the inelastic demand curve theory is accepted as plausible. However, if price were reduced by, say, 50%, firms felt that demand was bound to extend in time. But obviously, no firm would consider this policy because it would almost certainly result in severe losses. And no firm felt inclined to reduce price marginally if demand would not change, i.e. down the inelastic section of the demand curve. Therefore, it seemed reasonable to conclude that the

Plymouth firms were not optimising profits, were not optimising sales, and were not optimising returns on net assets.

It is thus suggested here that the Z-shape is far more relevant than the traditional demand curve used in the Chamberlin model, and that employed in basic market research. It is doubtful if the Z-shape has ever been used before, for even in the Harood (92) entry-forestalling model, demand is assumed to adjust when price is changed to produce normal profits only, and discouragement for new entrants.

The problem for entry-forestalling models is in part at least to decide whether it pays to forestall entry (and make fairly low profits for a long time, but with a large market share) or instead to go for short run optimisation in the Chamberlin (93) way (making high early profits but accepting a reduced market share and excess capacity in the long run owing to pressure from new entrants). It is sufficient to say that there was no evidence of entry-forestalling among the Plymouth Survey firms despite the Z-shaped demand curve. There is, of course, a good deal of literature on the subject which has gradually extended the model to fit oligopoly as well as monopolistic competition. Among the most important of the pioneer attempts to incorporate entry-forestalling into models of firms' behaviour were those of Andrews (94) developed by Edwards (95) (96) and of Bain (97) in the U.S.A. However, the work of Andrews in the field of full cost pricing and the reaction to it by Kahn (98) and Robinson (99) is perhaps more significant.

Andrews's theory rests on statements by businessmen or on questionnaires which they have completed. It may be summarised as follows:- (i) The price which businessmen will normally quote for a particular product

will equal the estimated average direct costs of production plus a costing margin. It is assumed that the average direct cost function will tend to be a horizontal straight line over a part of its length if the prices of the direct cost factors are given; (ii) The costing margin will normally tend to cover the costs of the indirect factors of production and provide a normal level of net profit, looking at the industry as a whole. Once chosen, the costing margin will remain constant, given the organisation of the individual business, whatever the level of output. It will tend to vary, however, with any general permanent changes in the prices of the indirect factors of production; (iii) Given the prices of the direct factors of production, price will tend to remain unchanged, whatever the level of output; and (iv) At that price, the business will have a more or less clearly defined market and will sell the amount which its customers demand from it. Much of this, of course, does coincide with the Plymouth Survey findings.

Some support for controlled price increases may be found via the Z-shaped demand curve in the application of some simple tests. Assuming that firms wish to raise profits then there are four basic ways of achieving this goal, i.e. improve the product mix, increase sales, reduce costs, or simply raise prices. Perhaps the most neglected method is the product mix. Many firms do not always know exactly what their costs are. Small firms tend to admit this and even the larger units with more data available, may find much of it misleading. If firms could switch resources into the more profitable lines then this would obviously enhance profit optimality. However, since this policy is unlikely to be applied, we are left with the three possibilities as set out in Table 7.15 below.

Table 7.15 Effect on Profitability from Raising Prices, Reducing Costs, and Increasing Sales

	Present figures (e.g)	After 1% increase in sales	After 1% reduction in costs	After 1% increase in prices with no reduction in demand
Sales	1000	1010	1000	1010
Materials	550	555	545	550
Wages	220	222	218	220
Overheads	160	160	158	160
Profit	70	73	79	80
% increase in profit	-	4%	12%	14%
Equity	500	500	500	500
Rate of return on equity	14%	14.6%	15.8%	16%

Source: Developed from Plymouth Survey Questionnaires; Question 87

The second column shows the effect of increasing sales by just 1%. Profit is increased by 4% and the return on equity improved by 0.6%. Increasing sales is a time honoured method of raising profit although firms might easily experience difficulties by overtrading. One stumbling block experienced by some of the Plymouth firms was the lack of demand for extra output. There was also the problem of liquidity which could mean higher charges for borrowed money. Nevertheless, if the opportunity exists, increased sales volumes can produce an increase in profits as shown in the table. But it certainly involves much more management and effort than simply raising prices.

Cost reduction has a more favourable effect on profits, increasing them by 12%, and improving the return on net assets by 1.8%. But, again, it is much more difficult to reduce costs than to increase prices.

The fourth column shows the effect of a price

increase of 1%. This was the amount by which the Plymouth firms believed prices could be raised without any firm actually suffering a fall in demand. Profits are increased by 14% and the rate of return improved by 2%. Clearly, this action, which involves the least effort, has produced the best result. And the Z-shaped demand curve points the way for this course of action.

Finally, the rather specialised nature of one-off production was examined. Not all firms were engaged in this type of work, of course, since it tended to be quite varied, sometimes complex, and the price was negotiated rather than determined by any other means. In the main, category "A" firms were the ones involved.

The major factor to emerge was a confirmation of the Z-shaped demand curve. Firms fixed price, after negotiation, below the upper limit of the inelastic section, and thus, once again, failed to produce the optimum return on investment.

Perhaps at this point it might be appropriate to state again from Chapter 2 a quote from Z. Brierley, chairman of a small firm, and member of the Smaller Firms Council of the C.B.I., Welsh Industrial Development Board: "I do not believe that small businesses are interested only in how much money they can make; I am convinced that financial rewards are often secondary to the satisfaction and independence which is to be obtained from running one's own enterprise" (100). Whilst this might well be true, it certainly could not, and should not, be used as an excuse for the deficiencies outlined in this, and foregoing chapters.

SUMMARY

PREVIOUS PRICING STUDIES The published evidence on

pricing behaviour was somewhat inadequate and inconsistent.

PRICE DETERMINANTS Some 86% of the Plymouth sample employed a rigid cost plus percentage approach to pricing. But the most successful firms were the ones practising short run flexible pricing geared to what the market would bear at the relevant output level.

PRICE INFLUENCES The distinction between price determinants and influences might go some way towards explaining the occasional conflict in the literature. Market conditions, profitability requirements, and technical problems of production were considered to be important influences by 80% of the firms, but the occasional price amendments in response to these influences were not conducted in a conscious profit optimising manner.

ONE-OFF PRICING Of the firms able to handle one-off jobs, exactly 50% of them practised far more price flexibility on these than they did for routine pricing. Although rigid C+% was adopted by the majority for routine work, flexibility was possible, was practised, and was successful, but almost exclusively on one-off jobs.

TARGET PRICING There was a general lack of mathematical harmony between the target rate of return and the average % mark-up. Firms failing to reach their targets could hardly have done otherwise with the ultimate % mark-ups employed. And the evidence suggested that the problem lay more within the pricing rather than the setting up of targets in the first instance.

COSTS OF PRODUCTION Four basic cost curve shapes were discovered for the four categories of firm, i.e. "A", "B", "C", and "D". Firms tended to use the L-shaped cost curve more as a "price guide line" rather than any market demand curve which might be estimated.

MARKET DEMAND CURVES Four basic market demand curves were discovered for the four categories of firm "A", "B", "C", and "D". Pure price taking in the Wiles tradition was not overwhelmingly apparent. (53)

THE Z-SHAPED DEMAND CURVE It was revealed by the firms themselves that the market demand curve possessed a perfectly inelastic section at the relevant output level. In short, the average revenue curve was roughly "Z-shaped". This indicated that prices could be raised by varying amounts depending upon the category of firm, without any fall in demand. Firms tended not to take advantage of this and consequently revenue was lost, profits were lower than the attainable, and returns on net assets were inevitably below optimum.

REFERENCES

(1) J. G. Udell, "How Important is Pricing in Competitive Strategy?" Journal of Marketing, Vol. 30, April 1966.

(2) P. J. Curwen, "Managerial Economics", Macmillan, 1974, p 114.

(3) Curwen, p 132.

(4) R. L. Hall and C. J. Hitch, "Price Theory and Business Behaviour", Oxford Economic Papers, Vol. 2, May 1939.

(5) P. M. Sweezy, "Demand Under Conditions of Oligopoly", Journal of Political Economy, Vol. 47, 1939.

(6) J. S. Earley, "Marginal Policies of Excellently Managed Companies", American Economic Review, March 1956.

(7) D. C. Hague, "Economic Theory and Business Behaviour", Review of Economic Studies, Vol. xvi, p 144.

(8) R. C. Skinner, "The Determination of Selling Prices", Journal of Industrial Economics, July 1970, pp 201-217.

(9) Earley, American Economic Review, March 1956.

(10) J. Sizer, "Note on the Determination of Selling Prices", Journal of Industrial Economics, Nov. 1971, p 88.

(11) A. W. Silbertson, "Surveys of Applied Economics - Price Behaviour of Firms", Economic Journal, Sept. 1970, pp 542-546.

(12) Dirlam, Kaplan, and Lanzillotti, "Pricing in Big Business", and Lanzillotti, "Pricing Objectives in Large Companies", American Economic Review, Vol. 48, Dec. 1958, pp 921-940.

(13) W. W. Haynes, "Pricing Decisions in Small Business", Lexington, Univ. of Kentucky Press, 1962.

(14) Hall and Hitch, Oxford Economic Papers, Vol. 2, May 1939.

(15) Sweezy, Journal of Political Economy, Vol. 47, 1939.

(16) Earley, American Economic Review, March 1956.

(17) Hague, Review of Economic Studies, Vol. xvi.

(18) Skinner, Journal of Industrial Economics, July 1970.

(19) Sizer, Journal of Industrial Economics, Nov. 1971.

(20) Silbertson, Economic Journal, Sept. 1970.

(21) Curwen, "Managerial Economics", p 140.

(22) C. J. Hawkins, "Theory of the Firm", Macmillan, 1973, p 73.

(23) Udell, Journal of Marketing, Vol. 30, April 1966.

(24) A. Hankinson, "Investment, Price, and Output Decision Making in the Small Firm", (incorporating The Greater Manchester Study), M.Phil. thesis, Southampton Univ. 1974, (unpublished as at 1977).

(25) W. W. Haynes, "Pricing Decisions in Small Business", Lexington, Univ. of Kentucky Press, 1962.

(26) Hall and Hitch, Oxford Economic Papers, Vol. 2, May 1939.

(27) Sweezy, Journal of Political Economy, Vol. 47, 1939.

(28) Earley, American Economic Review, March 1956.

(29) Hague, Review of Economic Studies, Vol.xvi.

(30) Skinner, Journal of Industrial Economics, July, 1970.

(31) Sizer, Journal of Industrial Economics, Nov. 1971.

(32) Silbertson, Economic Journal, Sept. 1970.

(33) H. A. Simon, "New Developments in the Theory of the Firm", and "Theories of Decision Making in Economics and Behavioural Science", American Economic Review, May 1962 and June 1959.

(34) Hall and Hitch, Oxford Economic Papers, May 1939.

(35) B. Fog, "Industrial Pricing Policies", trans. I. E. Bailey, North Holland Publishing Co., Amsterdam, 1960.

(36) A. D. A. Kaplan, J. B. Dirlam, and R. F. Lanzillotti, "Pricing in Big Business - A Case Approach", Brookings Institution, Washington, D.C., 1958.

(37) Simon, American Economic Review, 1959, reprinted in G. P. E. Clarkson (Ed) "Managerial Economics", Penguin Books, Harmondsworth, 1968.

(38) C. J. Hawkins, "Theory of the Firm", Macmillan, 1973, p 75.

(39) P. F. Drucker, "Business Objectives and Survival Needs: Notes on a Discipline of Business Enterprise", The Journal of Business, Vol. 31, No. 2, pp 81-90, April 1958.

(40) W. J. Baumol, "Models of Economic Competition", in P. Langhoff (Ed) "Models, Measurement, and Marketing", Prentice Hall, Englewood Cliffs, N.J. 1965, and in H. Townsend (Ed) "Price Theory", Penguin Books, Harmondsworth, 1972.

(41) G. P. E. Clarkson, "Interactions of Economic Theory and Operations Research", in A. R. Oxenfeldt (Ed) "Models of Markets", Columbia U.P., New York, 1963, and in G. P. E. Clarkson (Ed) "Managerial Economics", Penguin Books, Harmondsworth, 1968.

(42) R. M. Cyert and J. G. March, "A Behavioural Theory of the Firm", Prentice Hall, Englewood Cliffs, N.J. 1963.

(43) R. F. Lanzillotti, "Pricing Objectives in Large Companies", American Economic Review, Dec. 1958, and "Pricing Objectives in Large Companies - Reply", American Economic Review, Sept. 1959.

(44) Dirlam, Kaplan, and Lanzillotti, "Pricing in Big Business", The Brookings Institution, Washington, D.C., 1958.

(45) W. L. Baldwin, "The Motives of Managers, Environmental and the Theory of Managerial Enterprise", Quarterly Journal of Economics, May 1964, pp 244 to 248.

(46) N. W. Chamberlain, "The Firm - Microeconomic Planning and Action", McGraw Hill, New York, Ch. 4, p 207.

(47) A. E. Kahn, "Pricing Objectives in Large Companies - Comment", American Economic Review, Vol. 39, Sept. 1959, pp 670-678.

(48) G. C. Means, "Pricing, Power and the Public Interest", Harper, New York, 1962, p 236.

(49) Dirlam, Kaplan, and Lanzillotti, "Pricing in Big Business", p 130.

(50) Lanzillotti, American Economic Review, Vol. 48, Dec. 1958.

(51) M. Tamari, "A Postal Questionnaire Survey of Small Firms - An Analysis of Financial Data", Committee of Inquiry on Small Firms, Research Report No. 16, p 30.

(52) Hawkins, "Theory of the Firm", Macmillan, 1973, p 44.

(53) P. J. D. Wiles, "Price Cost and Output", Blackwell, Oxford, 1961.

(54) J. Johnston, "Statistical Cost Analysis", McGraw Hill, New York, 1960.

(55) C. F. Pratten, "Economies of Scale in Manufacturing Industry", Univ. of Cambridge, Dept. of Applied Economics, Occasional Paper No. 28, Cambridge, Univ. Press, 1971.

(56) C. F. Pratten, R. M. Dean, and A. Silbertson, "The Economies of Large Scale Production in British Industry", Univ. of Cambridge, Dept. of Applied Economics, Occasional Paper No. 3, Cambridge U.P., 1965.

(57) National Bureau of Economic Research, "Cost Behaviour and Price Policy", New York, 1963, and National Bureau of Economic Research, "Business Concentration and Price Policy", Princeton U.P., 1955.

(58) C. A. Smith, "Survey of Empirical Evidence on Economies of Scale", in (57) above and abridged in G. C. Archibald (Ed) "The Theory of the Firm", Penguin Books, Harmondsworth, 1971.

(59) M. Friedman, "Comment" from (57) above.

(60) A. Silbertson, "Economies of Scale in Theory and Practice", Economic Journal, March 1972, supplement.

(61) J. S. Mill, "Principles of Political Economy", 1848, W. J. Ashley (Ed) Longmans Green, 1926.

(62) A. Marshall, "Principles of Economics", 1890, (Ed) C. W. Guillebaud, Macmillan, London, 1961.

(63) P. J. D. Wiles, "Price Cost and Output", Blackwell, Oxford, 1961.

(64) J. Johnston, "Statistical Cost Analysis", McGraw Hill, New York, 1960.

(65) C. F. Pratten, "Economies of Scale in Manufacturing Industry", Univ. of Cambridge, Dept. of Applied Economics Occasional Paper No. 28, Cambridge U.P., 1971.

(66) C. F. Pratten, R. M. Dean, and A. Silbertson, "The Economies of Large Scale Production in British Industry", Univ. of Cambridge, Dept. of Applied Economics Occasional Paper No. 3, Cambridge U.P., 1965.

(67) A. Silbertson, "Economies of Scale in Theory and Practice", Economic Journal, March 1972, supplement.

(68) A. A. Thompson, "Economics of the Firm - Theory and Practice", Prentice Hall, Englewood Cliffs, New Jersey, 1973, p 287.

(69) "How Modern is American Industry?" McGraw Hill Survey, 1970.

(70) W. J. Eiteman and G. E. Guthrie, "The Shape of the Average Cost Curve", American Economic Review, Dec. 1952, pp 832-839.

(71) Hawkins, "Theory of the Firm", Macmillan, 1973, p 47.

(72) M. A. Utton, "Industrial Concentration", Penguin Books, Harmondsworth, 1970.

(73) J. M. Clark, "Competition as a Dynamic Process", Brookings Institution, Washington D.C., 1961.

(74) R. E. Kuenne (Ed) "Monopolistic Competition Theory", Studies in Impact. Essays in Honour of Edward H. Chamberlin, Wiley, New York, 1966.

(75) N. Kaldor, "The Irrelevance of Equilibrium Economics", Economic Journal, Dec. 1972.

(76) P. J. D. Wiles, "Price Cost and Output", Blackwell, Oxford, 1961.

(77) O. E. Williamson, "Economics as an Antitrust Defense", American Economic Review, March 1968.

(78) C. K. Rowley, "Antitrust and Economic Efficiency", Macmillan, London, 1973.

(79) H. Leibenstein, "Allocative Efficiency vs X-Efficiency", American Economic Review, June 1966.

(80) J. M. Clark, "Competition, Static Models, and Dynamic Aspects", American Economic Review, May 1955.

(81) S. G. Winter and E. S. Phelps, "Optimal Price Policy Under Atomistic Competition", in E. S. Phelps (Ed) "Microeconomic Foundations of Employment and Inflation Theory", Norton, New York, 1970.

(82) R. J. Ball, "Inflation and the Theory of Money", Allen and Unwin, London, 1964.

(83) E. T. Penrose, "The Theory of the Growth of the Firm", Blackwell, Oxford, 1959.

(84) P. D. Wiles, "Price Cost and Output", Blackwell, Oxford, 1961.

(85) E. H. Chamberlin, "The Theory of Monopolistic Competition", Harvard U.P., Cambridge, Mass., 1933.

(86) P. Sraffa, "The Laws of Returns Under Competitive Conditions", Economic Journal, Dec. 1926.

(87) J. Robinson, "The Economics of Imperfect Competition", Macmillan, London, 1933.

(88) E. H. Chamberlin, "The Theory of Monopolistic Competition", Harvard U.P., Cambridge, Mass., 1933.

(89) Chamberlin, p 56.

(90) Chamberlin, p 83.

(91) Chamberlin.

(92) R. F. Harrod, "Theory of Imperfect Competition Revised", in his "Economic Essays", Macmillan, London, 1952.

(93) E. H. Chamberlin, "The Theory of Monopolistic Competition", Harvard U.P., Cambridge, Mass., 1933.

(94) P. W. S. Andrews, "Manufacturing Business", London, Macmillan, 1949.

(95) H. R. Edwards, "Price Formation in Manufacturing Industry and Excess Capacity", Oxford Economic Papers, Feb. 1965.

(96) H. R. Edwards, "Competition and Monopoly in the British Soap Industry", Oxford U.P., 1962.

(97) J. S. Bain, "A Note on Pricing in Monopoly and Oligopoly", American Economic Review, March 1949.

(98) R. F. Kahn, "Oxford Studies in the Price Mechanism", (Review Article), Economic Journal, March 1952.

(99) E. A. G. Robinson, (Review Article on Andrews), Economic Journal, Dec. 1950.

(100) Z. Brierley, Daily Telegraph, 15 Jan. 1974.

CHAPTER 8

INVESTMENT PERFORMANCE AND OUTPUT DETERMINATION

CHAPTER 8
INVESTMENT PERFORMANCE AND OUTPUT DETERMINATION

INTRODUCTION

In considering the goals of firms, revenue maximisation is certainly one of the most important of the alternatives to profit maximisation. The interest it has attracted is no doubt partly due to its being presented very much in the mould of the traditional models of the firm. However, a fairly obvious alternative to maximising the value of sales is instead to maximise their volume, i.e. to maximise output. Indeed, Ames (1) has shown that this was the basic objective behind the typical Soviet enterprise. Kafoglis (2) suggests that output maximisation with a profit constraint could well fit the motives of some private firms, and also of public services which are judged by their breaking even whilst preferably raising output at the same time.

Output maximisation implies that firms choose that level of output where the demand and cost curves meet, i.e. where average cost equals average revenue. Obviously, where marginal cost is greater than average cost (decreasing returns to scale) this implies output beyond the Pareto optimal position, i.e. where MC = AR, and equally obviously, labour will be employed (as will other factors) up to the point where their price equals their average product. Pareto optimal output can, however, result if

firms operate on the base of a flat L-shaped cost curve, i.e. where AC = MC. This follows because at maximum output, subject to breaking even, AC = AR.

One model which has links with output maximisation is that of Averch and Johnson (3). They examined the implications of firms being constrained merely to make no more than a specified rate of return on capital. In one of its extreme forms the model yields the same results as output maximisation, i.e. if the constraint rate of profit is set equal to normal profits only, then the firm enjoys that degree of freedom to maximise output as per Kafoglis (4). At the other extreme (when the constraint rate of return is so high that it cannot be achieved at any price or output level) the firm may maximise profits in the conventional way or pursue any other motive it may care to select. Between these two extremes constrained profit maximisers will produce more output than unregulated firms. They will also increase their capital stock the more the maximum allowable rate of return is reduced, and will most likely not minimise cost at their chosen output level. Essentially, what happens is that since the firm is constrained as to the rate of return it can make on capital invested, it will invest more capital than unregulated firms so as to increase absolute profits while abiding by the rates of profit. It will therefore use more capital and probably less labour. These conclusions have, in fact, been dervived by Stein and Borts (5).

Just how far output maximisation has been developed as a strategy for optimum financial performance in real world small firms appears to be something of an unknown factor. Alternatively, if firms actively manoeuvred outputs and output levels, then it might be possible to demonstrate that as a result of such occasional manipulation, firms would be pursuing, at least in this respect,

optimum returns on investment.

Thus, how were output levels actually fixed by the Plymouth Survey firms? How rigid were output levels? Could the shape of the supply curve be established? What were the main output determinants, influences, and constraints? How high was the average level of excess capacity? What percentage of total capacity was needed for subsidiary products? If output were raised to the full capacity level, would profitability be increased? To what extent did firms actively seek out new sales opportunities and move into and out of reasonably accessible markets? Was there any correlation between capacity utilisation and returns on net assets? Was there a desired output level beyond the full capacity point, and was this likely to be achieved? Alternatively, was output and growth simply confined to constancy? These, and related matters, are now appraised.

OUTPUT FIXING

The ultimate effectiveness of the manufacturing unit is its ability to attract a continuous flow of new orders. Two major factors are likely to influence this inflow - price and delivery. Measurement systems tend in a variety of ways to focus on cost thus controlling prices. There is usually much less reporting on the ability of the system to meet planned and promised delivery performance. The most simple measure of this is to record the percentage of orders delivered by the promised delivery date. A further dimension can be added by showing the average number of days late for those orders not delivered on time. The trend in these two simple measures readily shows the extent to which the manufacturing unit is meeting the

delivery demands placed upon it. Yet, such charts were not in evidence among the Plymouth Survey firms.

Efficient operation of any system also requires a minimum level of work in progress to ensure that when a particular resource finishes a task, another job is waiting to start. This was generally well understood by the Plymouth firms, but what was much less well appreciated was that overfilling the system was potentially just as damaging as underfilling it. This is not only because it increases work in process and hence raises the level of money tied up in working capital, but also because each additional job beyond that which is necessary, further complicates the task of constantly achieving efficient scheduling, utilisation, and the ultimate optimisation of returns on capital.

Clearly, balanced scheduling is required, but perfect synchronisation is, of course, impossible, because both the volume and the work content of the input are always subject to change. In certain Plymouth firms, chronic imbalance appeared to be an accepted part of the total system. The section which was constantly under capacity was readily recognised as the creator of the bottleneck. But the over-capacity section was far more likely to survive relatively unnoticed, particularly when occasional peak demands, e.g. in the printing trades, did require all the available capacity. Recognition of the cost of meeting peak loads at different points in the system is vital, but the majority of the sample firms did not appear to give this very much priority.

Successful output fixing does require rather more thought than simply allocating fixed quotas of work to departments, sections, and individuals. A certain flexibility, for example, is needed to avoid the pitfalls outlined above. But the extracts below indicate clearly

that this degree of planning was lacking among many of the Plymouth Survey firms. Indeed, the typical unit, in each of the four sizes of firm, appeared to await a contract or estimate demand from historical data, and then allocate quotas subject to certain plant constraints. The outcome of this was a suspicion of output inflexibility over the medium to long period of time, rather than the opposite. But this specific issue is considered in greater depth in due course.

"Continuous production runs are possible despite our supplying 462 lines. Output levels tend to be fixed on a period basis and are held until amendment becomes necessary". (Code P1; Employees 486; Production Run Categories C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 89 and 90).

"Extended outputs are available although the occasional constraint can disrupt the flow. Since production is of a standard nature, output levels can be determined in advance at different intervals". (P2; 95; D; FDT; Brewing; PSQ,Q89 and 90).

"Production can take place in extended runs. After short run demand has been assessed, output is then broken down and determined on a 4 week target basis". (P3; 50; C; FDT; Confectionery; PSQ,Q89 and 90).

"Continual batch work is possible including the packaging process. Market demand is roughly known and production levels are fixed to meet this. If sales fall short then production for stock occurs". (P4; 600; D; FDT; Baby Food; PSQ,Q89 and 90).

"Very long batches are possible but output levels have depended, for example, upon such items as the availability of packing labour. But usually, production is fixed by periodic quota". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q89 and 90).

"Although the work is of a routine nature the market does fluctuate daily and long production runs are only possible over the short term. Thus, our supply has to balance with demand and output flexibility is imperative". (P6; 450; D; FDT; Meat; PSQ,Q89 and 90).

"Semi-continuous production runs occur and output levels are fixed on a fractional time basis, e.g. 200 or 300 dozen bottles per hour required". (P7; 20; C; FDT; Minerals; PSQ,Q89 and 90).

"Repeat orders are expected and extended runs are prepared for the main lines. Specific outputs are determined by the hour, e.g. 9 ovens X 222 loaves = 2000 loaves per hour". (P8; 300; C; FDT; Bread; PSQ,Q89 and 90).

"About 90% of production is routine and fairly extended runs are regarded as normal. Quotas are set for specific periods and these are retained over the medium term at least". (P9; 15; D; CAI; Fertiliser; PSQ,Q89 & 90).

"Despite the occasional unforeseen bottleneck, repeat batch work is practised. However, output ultimately depends upon capacity and the availability of the drier, e.g. 5 days X 24 hours represents the maximum drying capacity and output is inevitably geared to this". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q89 and 90).

"Although long batches are possible on average, only medium runs are undertaken. Economic batch quantities are established on known capacity and previous records". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q89 and 90).

"Daily output quotas are determined and, in the main, are repeated". (P12; 8; C; MME; Injection Moulds; PSQ,Q89 and 90).

"Restricted production runs, and one-offs, mean that only small batches are possible on average. Market demand is estimated and output is fixed by daily/weekly quotas subject to labour availability, etc". (P13; 170; B; MME; Steelwork; PSQ,Q89 and 90).

"Usually an annual target requirement is agreed and a number of machines to be produced, e.g. 500, is determined". (P14; 468; B; MME; Machine Tools; PSQ,Q89 and 90).

"Production runs are practically non-existent, although the occasional small batch can arise. Output levels depend entirely on the market but once this is established, each man is simply given a quota to cover a period of time". (P15; 14; B; MME; Industrial Signs; PSQ,Q89 and 90).

"Since reasonably extended batch work is available, outputs can be fixed at all levels of factory capacity by the quota system, e.g. 1000 brackets per hour". (P16; 10; C; MME; Press Tools; PSQ,Q89 and 90).

"Production targets are based upon historical data, and the policy of varying output levels over the short run is not employed". (P17; 90; C; MME; Packaging Machinery; PSQ,Q89 and 90).

"Negligible production runs exist since the vast majority of our work consists of one-offs. Market demand is limited by capacity and output has to be fixed at 12 to 14 boats per year. We have no plans to expand". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q89 and 90).

"Output levels are initially determined by current and expected demand, and then fixed by capacity via the quota system". (P19; 60; B; MME; Boats; PSQ,Q89 and 90).

"Batch work is rather restricted, e.g. 25% only of production is routine. Output levels are set on a monthly target basis and are changed only over the longer term". (P20; 120; B; MME; Boats; PSQ,Q89 and 90).

"Production runs are virtually nil; all work being of the one-off specialist variety. Output levels are thus fixed on the all or nothing principle". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q89 and 90).

"Market demand dictates the overall quantity to be produced and then quotas are allocated per man/day". (P23; 50; B; MME; Iron Castings; PSQ,Q89 and 90).

"Medium batches are usually possible and these are based on past demand and annual budgets". (P24; 200; C; MME; Toolmaking; PSQ,Q89 and 90).

"No production runs can be undertaken as all work is specialised one-offs. Output levels are determined entirely by demand and since we do not actively seek out new customers it is possible that profits could be lost by this policy". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q89 and 90).

"Output levels are fixed on a piecemeal basis once overall market demand has been ascertained. For example, target deliveries are set and capacity and resources are then harmonised to meet them". (P26; 70; A; MME; Trawler Repairs; PSQ,Q89 and 90).

"Production can be continuous in our main activity, but labour absenteeism, capacity of plant, over optimistic targets, etc., have been known to disrupt the runs. At factory floor level, output is simply allocated on a quota basis". (P27; 40; D; MME; Thermowells; PSQ,Q89 and 90).

"Only limited production runs are possible and output levels are determined by the length of order books in the first instance. Then allocations are made for stock and sales on an "X" units per day basis". (P28; 4; B; MME; Aluminium Castings; PSQ,Q89 and 90).

"An output quota system per unit of labour is employed which tends to be rather inflexible on the whole". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q89 and 90).

"Output levels are constrained by the time available since most of our work consists of very limited runs". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q89 and 90).

"Output targets are fixed on a time/quota basis. Most work consists of one-offs". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q89 and 90).

"Production runs in the conventional sense are extremely restricted owing to one-off jobs and repair work. Output levels depend upon these factors and the capacity available". (P33; 3; A; MME; Luxury Yachts; PSQ,Q89 and 90).

"The plant is capable of one-offs and medium to extended batch work. Since one-offs do demand extra resources this has an inhibiting effect on output flow. Normally estimates of likely demand are made, and projections are prepared. Then output levels are set on a monthly basis until the contracts are completed". (P34; 20; B; EE; Cold Rooms; PSQ,Q89 and 90).

"The number of productive hours and capacity available at the time in question are the main determinants of output levels". (P35; 20; B; EE; Electric Motors; PSQ,Q89 and 90).

"Extended production runs are available and output proceeds on a target quota per week/hour basis once contracts have been secured. Production for stock occurs when excess capacity exists". (P36; 122; C; EE; Communication Equipment; PSQ,Q89 and 90).

"Current orders fix the level of activity, but failure to meet occasional delivery dates might stimulate output levels further. Additionally, the extent of credit for supplies, postponed investment, products outside our range, and factory capacity, have all affected output levels in the past". (P37; 27; C; EE; Location Systems; PSQ,Q89 and 90).

"Delivery dates are known and output quotas are geared to these. For example, current targets are £6000 to £7000 sales per month". (P38; 8; B; EE; Control Panels; PSQ,Q89 and 90).

"Repeat orders are fairly commonplace and thus output can be set on a weekly/monthly basis. And once fixed, it tends to remain at that level". (P39; 800; D; TLCF; Footwear; PSQ,Q89 and 90).

"Production runs tend to be restricted by the quality and the necessary re-training of the labour force. Output is thus determined to a large extent by the availability of manpower. If labour is stable, then output levels tend also to stabilise". (P40; 158; B; TLCF; Clothing; PSQ,Q89 and 90).

"Output is simply fixed on an historical ability to cope, and on a targets and piece work system. Production runs tend to be repeatable in the main". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q89 and 90).

"Orders are allocated on a target per week basis along with piece work schemes". (P43; 13; C; TLCF; Wet Suits; PSQ,Q89 and 90).

"Output levels are initially fixed by trade demand. Then the work force is allocated quotas which are only changed over the longer term". (P44; 45; D; BPG; Glass; PSQ,Q89 and 90).

"Output targets are set pre-season and then a weekly quota is produced, which tends to be fairly stable". (P45; 23; C; BPG; Pottery; PSQ,Q89 and 90).

"Medium sized batches are possible and after seasonal demand has been ascertained, output quotas are fixed on a weekly basis. Any over-production which might occur is simply allocated as stock". (P46; 140; C; BPG; Pottery; PSQ,Q89 and 90).

"Output levels are fixed from historical data. Targets are then set per week and are normally retained

over a period of time". (P47; 13; B; BPG; Pottery; PSQ, Q89 and 90).

"Historical demand is known and is used for current output fixing. Our policy of stable output is based on the assumption that it is uneconomical to change levels too frequently". (P48; 25; C; OMG; Furniture; PSQ,Q89 and 90).

"Output determination is simply a matter of fixing, say, 400 units per week in order to meet delivery dates". (P49; 19; B; OMG; Blinds; PSQ,Q89 and 90).

"Large batch production is feasible but certain constraints, e.g. raw materials delivery, capacity available, etc., do produce output shortfalls from time to time. Basically, production levels are fixed on a quota system". (P50; 44; C; OMG; Cardboard Containers; PSQ, Q89 and 90).

"Production consists of a series of one-offs and small runs. Labour is given the task and the delivery dates and output proceeds accordingly". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q89 and 90).

"The death rate is known to be 1.2% and our sales growth has been around 10% per annum. These two factors determine overall output levels in any 13 week period. This is then broken down into weekly targets and are retained until a change becomes necessary". (P52; 22; D; OMG; Coffins; PSQ,Q89 and 90).

"Output levels can rarely be fixed over the long run. Short run fluctuations are notorious in the printing trade. But hopefully daily quotas are set, e.g. 30 hour week fixed if 25% excess capacity exists". (P54; 24; B; OMG; Printing; PSQ,Q89 and 90).

"Production runs in the normal sense are negligible, and demand tends to depend upon quality work rather than speed of delivery, price, etc. But we do set targets, e,g, 90 completed vehicle jobs per month". (P55; 25; A; OMG; Vehicles; PSQ,Q89 and 90).

"Most output is organised on a period basis, e.g. 8000 printed copies over 5 weeks. This arrangement would simply proceed until the contract was completed". (P56; 50; B; OMG; Printing; PSQ,Q89 and 90).

"Order books determine overall output levels. Some quesswork projections follow. And then targets are

allocated to meet the delivery dates. In short, a fairly routine system". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q89 and 90).

"Continuous production runs are possible and output, based on historical data and current demand, can be fairly predictably set over periods of time". (P59; 175; D; OMG; Concrete; PSQ,Q89 and 90).

"Weekly output quotas are set and these are only adjusted when demand appears to have changed significantly". (P60; 106; C; OMG; Building Materials; PSQ,Q89 and 90).

"Fairly long batch work is usual and 5 year forecasts are possible. These are then transposed into monthly targets and eventually into standard hours per week". (P62; 400; C; OMG; Business Systems; PSQ,Q89 and 90).

"No production runs are available in the conventional sense, but a certain work flow is sometimes possible. Winter and summer targets are known from previous experience, and this enables labour to be allocated quotas, which are retained for unspecified periods". (P65; 30; B; OMG; Tents; PSQ,Q89 and 90).

Output fixing varied according to the size of firm and the industry in question, but three broad approaches could be identified: (i) output levels geared specifically to market demand; (ii) output levels fixed on a target or quota per period system; or (iii) output levels held constant as a policy.

Table 8.1 Most Dominant Output Fixing Approach. Plymouth Survey

Output Fixing Approach	Employee Groups 0-24	25-99	100-199	200+	Totals
MARKET DEMAND e.g. short run estimates; current and expected order books;	8 (31%)	6 (33%)	2 (17%)	3 (33%)	19 (29%)

Table 8.1 (Continued)

Output Fixing Approach	Employee Groups 0-24	25-99	100-199	200+	Totals
MARKET DEMAND (continued) one-off jobs "all or none" principle; historical data, etc.					
TARGET/ QUOTA PER PERIOD SYSTEM e.g. yearly, monthly, weekly, daily, hourly, etc.	14 (54%)	7 (38%)	6 (50%)	4 (44%)	31 (48%)
SHORT-MEDIUM RUN CONSTANT OUTPUT POLICY e.g. repeated quotas; production for stock; routine production, etc.	4 (15%)	5 (28%)	4 (33%)	2 (22%)	15 (23%)
TOTALS:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Questions 89 and 90

Table 8.1 shows that just under 30% of the sample were scheduling output in response to market forces implying reasonable degrees of flexibility. Almost 50% of the firms fixed output simply by allocating quotas which would be retained until events dictated otherwise. But even more striking was the finding that 23% actually employed a "constant output" policy.

This whole question of output rigidity is important. If we are testing the optimising behaviour of small firms in various areas, e.g. investment, pricing, etc.,

then output decision making cannot be excluded. Suppose that a firm pursued a profit maximisation policy, then it would have, at least, to continually adjust its output to the point where marginal cost = marginal revenue. Whilst it is certainly not claimed here that such a policy would be possible in the real world, it is suggested that firms displaying a marked inflexibility of output fixing would be unlikely to optimise profits and, in turn, returns on net assets. As a consequence, output rigidity would appear to be worthy of further examination.

OUTPUT RIGIDITY AND THE S-SHAPED SUPPLY CURVE

Some decisions affect the nature of demand and hence both the timing and sizes of batches required from the production system. These decisions should preferably be considered in terms of their impact on the cost of operating the system. What is the cost of uneven demand? The external or internal customer might well be persuaded to help level out demand particularly if part of the corresponding reduced cost is passed on.

It was evident among some Plymouth Survey firms that many so called fluctuations in demand were simply created by the various links of the distribution system, each in turn exaggerating an initial minor variation. A hard look at forecasting and stockholding policies in terms of the effect on manufacturing capacity might well have shown that greater and more stable output could have been obtained if modifications had taken place. Thus, whilst the case for evening out demand and promoting a reasonable degree of output stability might be acknowledged, this is not to argue the case for output rigidity beyond the short term.

We have seen that some 15 firms in the Plymouth Survey, i.e. 23%, specifically adopted a "constant output" policy and, indeed, others were varyingly sympathetic to this. Whilst it should be mentioned that the 15 companies were in categories "C" or "D" (in the main) where continuous production runs were possible, and where output quotas tended to be fixed over the longer term, a significant number failed to reach their expected rate of return on capital.

"Output levels tend to be held until amendment becomes necessary". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 90).
(NB) Target 50%; Actual 22.9%; Fail.

"Quotas are set and are retained over the medium term at least". (P9; 15; D; CAI; Fertiliser; PSQ,Q90).
(NB) Target 20%; Actual 4.59%; Fail.

"Quotas are determined and in the main repeated". (P12; 8; C; MME; Injection Moulds; PSQ,Q90).
(NB) Ex-38 firm sample.

"Varying output levels over the short run is not employed". (P17; 90; C; MME; Packaging Machinery; PSQ,Q90).
(NB) Target 20%; Actual 18.94%; Fail.

"Output levels are changed only over the longer term". (P20; 120; B; MME; Luxury Boats; PSQ,Q90).
(NB) Target 50%; Actual 47.01%; Fail.

"Output.....tends to be rather inflexible as a whole". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q90).
(NB) Ex-38 firm sample.

"Once output is fixed it tends to remain at that level". (P39; 800; D; TLCF; Footwear; PSQ,Q90).
(NB) Target 22%; Actual 20%; Fail.

"Production runs tend to be repeatable in the main". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q90).
(NB) Ex-38 firm sample.

"Quotas are only changed over the longer term". (P44; 45; D; BPG; Glass; PSQ,Q90).
(NB) Ex-38 firm sample.

"Any over-production which might occur is simply allocated to stock". (P46; 140; C; BPG; Pottery; PSQ,Q90).
(NB) Target 20%; Actual 20.46%; Success.

"Our policy of stable output is based on the assumption that it is uneconomical to change output levels too frequently". (P48; 25; C; OMG; Furniture; PSQ,Q90).
(NB) Ex-38 firm sample.

"Targets are retained until a change becomes necessary". (P52; 22; D; OMG; Coffins; PSQ,Q90).
(NB) Ex-38 firm sample.

"Output.....can be predictably set over periods of time". (P59; 175; D; OMG; Concrete; PSQ,Q90).
(NB) Ex-38 firm sample.

"Output quotas.....are only adjusted when demand appears to have changed significantly". (P60; 106; C; OMG; Building Materials; PSQ,Q90).
(NB) Ex-38 firm sample.

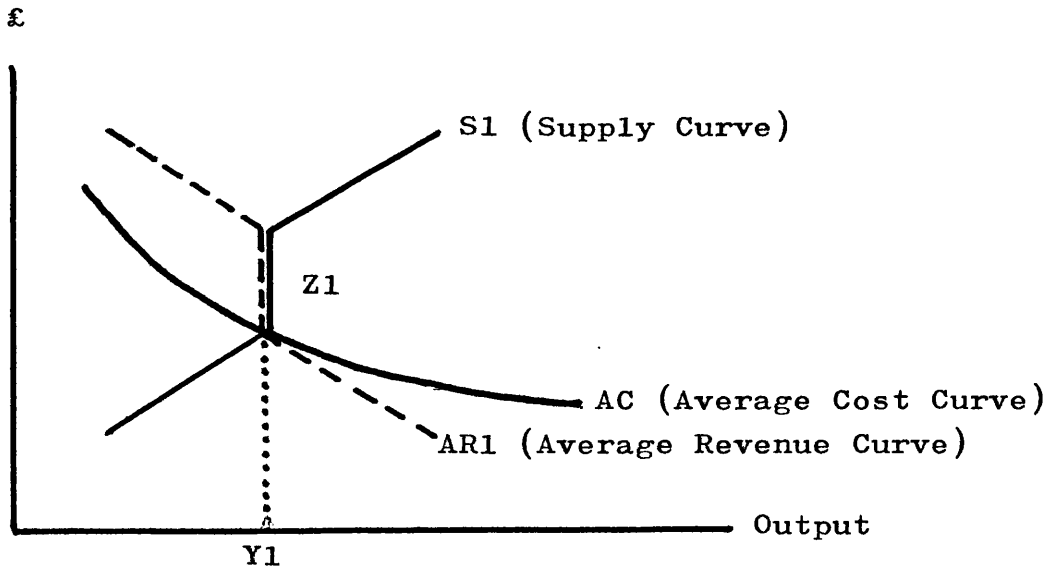
"Quotas.....are retained for unspecified periods". (P65; 30; B; OMG; Tents; PSQ,Q90).
(NB) Target 40%; Actual 15.33%; Fail.

Specifically, out of the 15 concerns, 7 were part of the provisional 38 firm sample used in Chapter 6. And 6 of these 7 firms actually failed to achieve the target they themselves considered to be reasonably attainable. Whether a link between output rigidity and investment performance exists or not cannot be determined on the strength of these results alone. But the apparent relationship is interesting.

However, the question which emerged was how rigid were output levels? What magnitude of a price, cost, and demand change would motivate a change in supply? The Plymouth Survey firms were asked how output would react to an increase in demand. The results taken from Plymouth

Survey Questionnaires, Question 96, appeared to coincide with the findings on Z-shaped demand curves in Chapter 7. Significant changes in price, cost, and demand, would affect levels of output, but marginal changes would not. Thus, the supply curve had a perfectly inelastic section through the point "Z", indicating output rigidity at output level Y1 over a price range. In short, the supply curve was roughly "S-shaped". This vertical section in equilibrium coincided with the vertical section of the Z-shaped demand curve, and the average cost curve could be assumed to pass through the lower points of the common perpendiculars. Figure 8.1 demonstrates this.

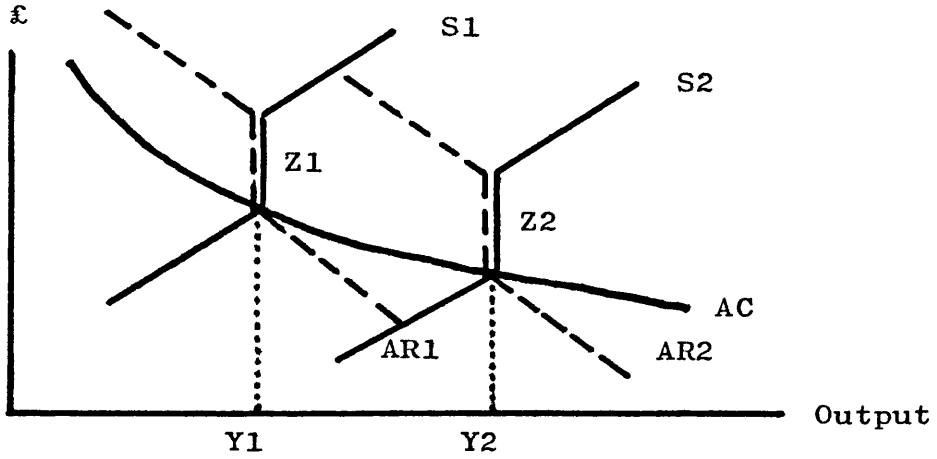
Fig 8.1 Supply Curve with Inelastic Section Giving Output Rigidity. Plymouth Survey.



Source: Plymouth Survey Questionnaires; Question 96

Assume now an increase in demand from AR1 to AR2. S1 moves to S2, and the perpendicular sections "Z" again coincide causing output rigidity at the higher level Y2.

Fig 8.2 Supply Curve with Inelastic Section Giving Output Rigidity at a Higher Output Level. Plymouth Survey



Source: Plymouth Survey Questionnaires; Question 96

Responses indicated that a marginal increase in demand would not necessarily raise output, the inelastic price band tending merely to move upwards at the existing output level.

Fig 8.3 Output Rigidity at the Original Output Level despite a Marginal Increase in Demand. Plymouth Survey

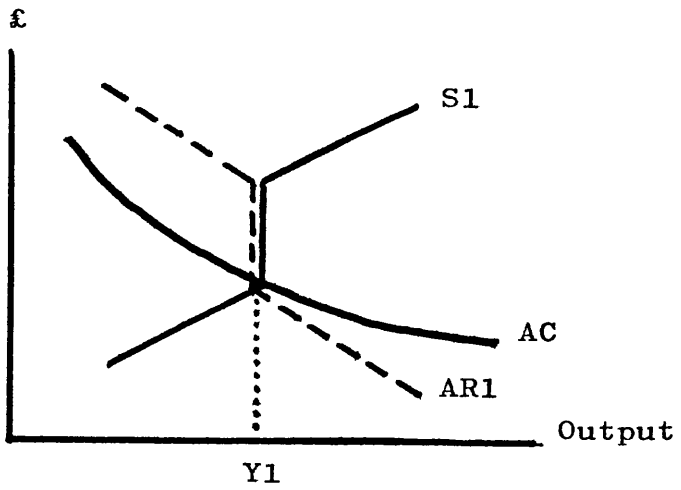
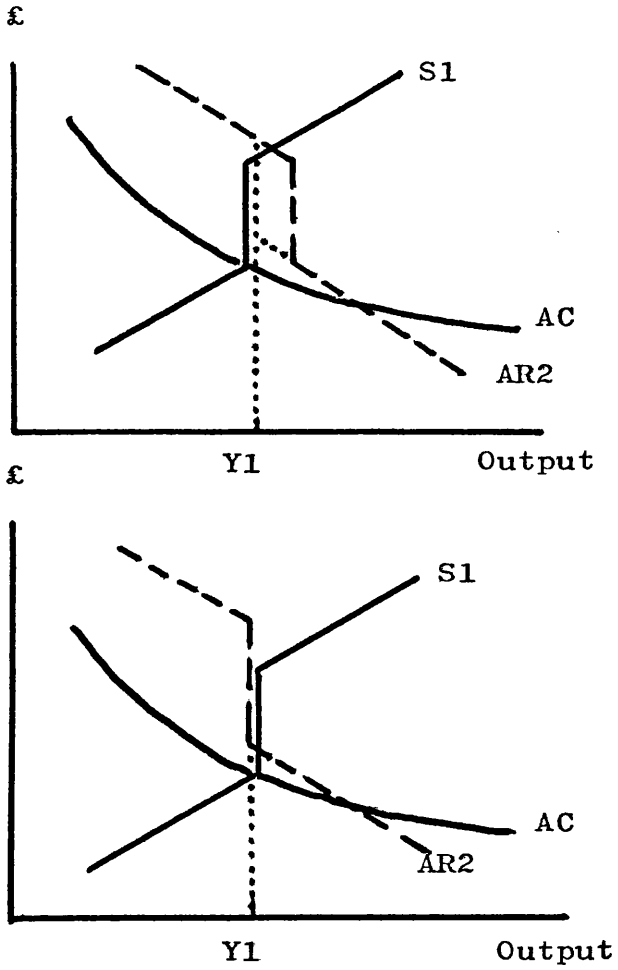


Fig 8.3 (Continued)

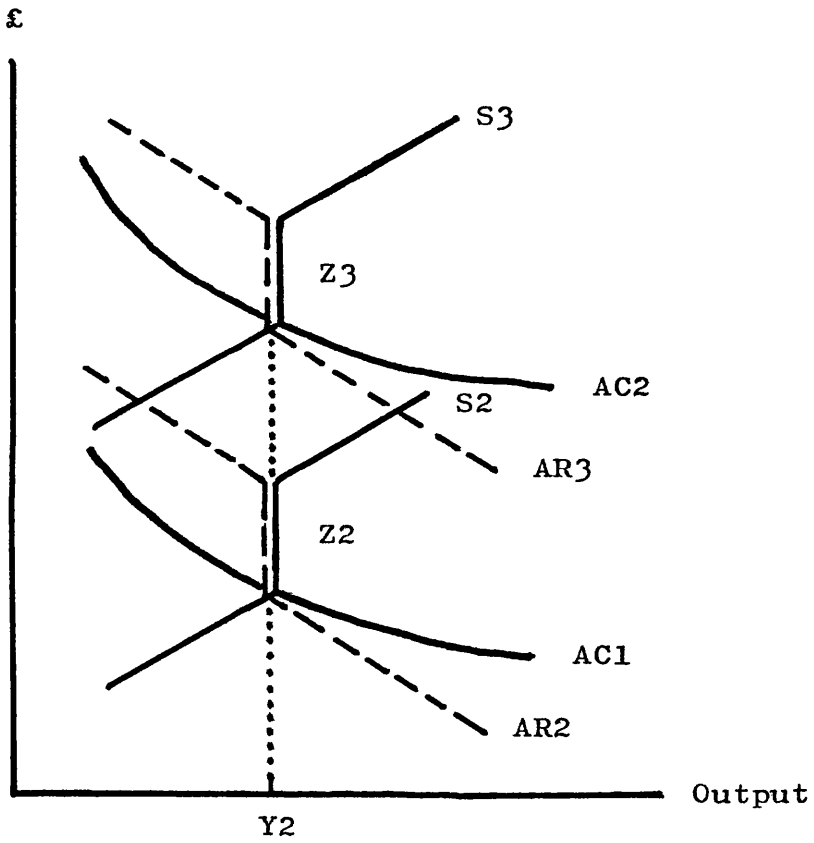


A marginal increase in demand moves AR1 to AR2. The vertical section of the demand curve moves upwards. Eventually, the supply curve matches it. Output remains at Y1.

Source: Plymouth Survey Questionnaires; Question 96

Consider now a rise in costs, e.g. as a result of inflation. Output remains static but the average cost curve now moves upwards, the demand and supply schedules go with it, and the firm still produces the same level of output Y2 at the higher price range "Z3". Figure 8.4 refers.

Fig 8.4 Output Stability at the Original Output Level After Increases in Costs. Plymouth Survey



Source: Plymouth Survey Questionnaires; Question 96

It is thus proposed that the nature of the supply curve (and the demand curve) made for output rigidity, at least over the short run. The chances of output levels being raised or lowered in response to changes in demand appeared to depend more upon the significance of the change rather than the specific desire to optimise returns via output manipulation.

The employment of an S-shaped supply curve in the literature is probably unknown. But the logic behind

such a curve is respectable, the case for its introduction, along with the Z-shaped demand curve, is strong from the evidence provided by the Plymouth Survey. Indeed, certain unsolicited findings from the 1971 Greater Manchester Study (6) suggested that output rigidity was not only an observable practice, but also a pursuable objective.

"Output is governed by current demand and no profitable order would be refused. Output can be adjusted if necessary, but not at short notice". (Code GM14; Employees 95; S.I.C MME; Main Activity Calender Bowls; Source Greater Manchester Study, Question 20).

"Generally, output is based upon output in the previous period". (GM16; 25; MME; Precision Tools; GMS, Q20).

"Output levels are fixed in the first instance by annual budgeted requirements to provide an acceptable profit. This turnover is based on the historical trading achievement in the previous year; current and projected trading situations; and provision for a percentage planned expansion. However, an essential factor in our decision making is output stability". (GM22; 67; MME; Heating Engineering; PSQ,Q20).

"Historical output fixing is an easy and convenient method". (GMS24; 45; MME; Fabrications; GMS,Q20).

"Basically, we use historical output fixing although slight adjustments are possible by overtime or stock piling". (GM28; 40; TLCF; Dressmaking; GMS,20).

"Our objective is to maximise production at all times, and the various lines of output are adjusted from time to time to achieve this, although this is difficult". (GM29; 69; TLCF; Footwear; GMS,Q20).

"Output levels are fairly rigid and are fixed once a year on past performance and the state of the market". (GM34; 200; OMG; Furniture; GMS,Q20).

"Output increases, for example, can depend on anticipated problems in the production flow, such as annual plant maintenance. But this implies medium to long term

planning of output levels". (GM38; 18; OMG; Oil Blending; GMS,Q20).

Was this rigidity inevitable or did it simply apply to certain firms? An identification of the basic output determinants, influences, and constraints, could be helpful in the answering of this question.

OUTPUT DETERMINANTS, INFLUENCES, AND CONSTRAINTS

The separation of ownership from control and the link between salaries and sales - Roberts (7) and McGuire (8) - were among many factors which led Baumol (9) (10) (11) to believe that managers were more likely to be interested in maximising sales (output) rather than profits. In particular he thought that their interest would centre on sales value as opposed to volume because, of course, maximum volume involves a zero price. Maximising sales revenue requires a price/output level where marginal revenue is zero, i.e. where no price change would increase sales value so that the firm is at the peak of its total revenue curve.

So simple a motivation is not really adequate. At the level of output where revenue was maximised, costs might exceed revenue and the company would sustain a loss. Baumol accepted that some profits were necessary for survival. Managers, he thought, would have in mind a constraint level of profit which would be just enough to keep shareholders satisfied and at the same time make it possible to borrow funds to finance future growth. The company's motivation was, therefore, to maximise sales revenue subject to profits being at least equal to the constraint level.

Baumol has drawn some interesting conclusions from his model. He has shown that if fixed costs, e.g. overheads, increase in the short run, then revenue maximisers will increase price and reduce output - the higher costs preventing their making the constraint level of profit unless they move back nearer to the maximum profits position. On the other hand, the profit maximiser's price/output level remains unchanged. Baumol also concludes that revenue maximisers will in general produce and advertise more than profit maximisers.

The revenue maximising model has led to much interest and much dispute. Shepherd (12) claimed that in oligopoly, for example, the firm would be faced by kinked demand curves and that if the kink were severe enough, revenue and profits could be maximised at the same output level. But Shepherd's conclusions have been shown by Hawkins (13) not to hold if advertising or any other form of non-price competition is possible, which it normally is.

As far as the motivation of output/revenue maximisation is concerned, Rosenberg (14) has questioned its plausibility and Peston (15) has looked at some of the implications of a more general approach where revenue and profit both form part of the firm's utility function.

As for empirical testing of Baumol's model, nothing very conclusive as yet has emerged - Hall (16), and Mabry and Siders (17) - and clearly any data concerning the motivation behind output optimisation would be useful. With this in mind, the Plymouth Survey interviewees were asked to consider those factors which might cause outputs/sales levels to be other than they would normally be. In short, what were the major output determinants, influences, and constraints?

"Safety and hygene problems have affected output levels occasionally since many of the requirements are basically uneconomic in the first instance". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 91).

"The unsuitable nature of the plant and its obsolescence have constrained output over the years. Despite this we have no plans to move". (P2; 95; D; FDT; Brewing; PSQ,Q91).

"Market demand determines output levels in the first place, but labour problems, fixed priced contracts, and warehousing difficulties have been known to cause amendments". (P3; 50; C; FDT; Confectionery; PSQ,Q91).

"After roughly assessing the market, output is determined by fixing specific amounts per period, and keeping to them, producing for stock if necessary". (P4; 600; D; FDT; Baby Food; PSQ,Q91).

"Demand has been fairly predictable but packing labour has not. Current inflation, particularly rising wage bills which have caused losses, could lead to reduced output levels over the longer term". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q91).

"The market fluctuates daily and supply has to meet demand accordingly. But labour shortages have also influenced output levels". (P6; 450; D; FDT; Meat; PSQ,Q91).

"Continuous production is possible and output can be organised over lengthy periods, but fundamentally market demand determines output, whilst rivalry, labour availability, and the weather, influence it. A major constraint is our under-sized plant and the council's refusal to sell adjacent land which would improve the position". (P7; 20; C; FDT; Minerals; PSQ,Q91).

"Predictable demand forms the basis of output scheduling. But it is known that demand falls 2% per annum in favour of other non-basic foods. Demand also reacts inversely to the economic situation". (P8; 300; C; FDT; Bread; PSQ,Q91).

"About 90% of production is routine and repeatable with output quotas being held over the medium term. But plant capacity, seasonal demand, labour difficulties, and rising costs of production, could all influence the levels". (P9; 15; D; CAI; Fertiliser; PSQ,Q91).

"Demand determines output over the longer term, but the short term availability of raw materials could severely influence the fixing". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q91).

"Demand permits output to be determined on a 12 monthly basis but loading the production line efficiently, plant capacity, labour, expertise, etc., constitute output level constraints". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q91).

"Orders can require short or long production runs. The latter is normally given priority, and is thus a major determinant of output. However, absenteeism, adaption of the plant, and rising costs of production can influence and constrain output levels". (P12; 8; C; MME; Injection Moulds; PSQ,Q91).

"Market demand initially determines output levels, whilst capacity and labour difficulties contrain them. Seasonal problems, the weather, poor planning in the building trade, etc., all serve as occasional output influences". (P13; 170; B; MME; Steelwork; PSQ,Q91).

"The state of trade must always be a significant determinant of output levels. But other factors can influence the planning. For example, in order to contribute to rising overheads during a slack period, we attempted a low profit margin contract. Thus, the size and rate of change of overheads among other items can influence output fixing". (P14; 468; B; MME; Machine Tools; PSQ,Q91).

"The market determines output levels; labour availability influences them; and plant and machine capacity contrain". (P15; 14; B; MME; Industrial Signs; PSQ,Q91).

"Long batches are possible from known demand and this factor initially determines levels of output. However, the capacity to cope with the quotas remains both an influence and a constraint". (P16; 10; C; MME; Press Tools; PSQ,Q91).

"Output targets are set via market demand and the length of production run entailed. All this, however, can be affected by labour problems, and general managerial complacency as a result of, for example, a non-growth policy". (P17; 90; C; MME; Packaging Machinery; PSQ,Q91).

"All output is fixed on a short run basis. If one boat is cancelled, then we simply take on another. Out-

put is contrained by our maximum capacity of 12 to 14 boats per year only". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q91).

"Current and expected demand determine output levels and capacity, market forces, seasonal factors, the danger of over-trading, etc., all influence them. The whole question of whether the product can actually be made or not, is the major output constraint here". (P19; 60; B; MME; Boats; PSQ,Q91).

"The market for luxury boats and standard models is known. This constitutes the determinant. Capacity of the plant, skilled labour availability, etc., constitute the influences and constraints". (P20; 120; B; MME; Luxury Boats; PSQ,Q91).

"All production is one-off and output is determined by the all or none principle. Output is more likely to be raised in the short run when excess capacity is high rather than when it is low. No diversification is practised and this factor alone contributes to fluctuating capacity". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q91).

"Current and expected demand are traditional output determinants, whilst labour and plant capacity are examples of influences and constraints". (P22; 21; B; MME; Boats; PSQ,Q91).

"Market demand dictates the long run overall quantity to produce. Costs of production, plant capacity, etc., are the main short run output influences". (P23; 50; B; MME; Iron Castings; PSQ,Q91).

"Past demand is used, in the main, to determine current output levels, but costs of production, plant capacity, labour availability, etc., can influence or constrain these levels". (P24; 200; C; MME; Toolmaking; PSQ,Q91).

"Output is determined by customer demand since all work is of a one-off nature. This factor is the main determinant. Occasionally, however, new techniques in production, rivalry in the market, labour availability, 3-day working weeks, etc., influence the output flow". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q91).

"Market demand for our services initially determines output levels. Plant capacity is an example of an output contraint, and labour availability is an example

of an influence". (P26; 70; A; MME; Trawler Repairs; PSQ,Q91).

"The length of order books is the fundamental determinant of output levels. Whether the capacity and expertise is instantly available or not after the contract has been secured, tends to act as an influence and a constraint". (P27; 40; D; MME; Thermowells; PSQ,Q91).

"Order books and quantities required for stock determine initial levels of output, whilst difficult working conditions causing failure to meet delivery dates, long run expected demand, overtime working, rising costs of production, plant capacity, etc., all serve as influences and constraints". (P28; 4; B; MME; Aluminium Castings; PSQ,Q91).

"Output tends to be rather inflexible in the main but clearly, length of order books, and expected demand are the basic determinants. Influences of output levels include plant capacity if nearing 100%, and the availability of part-time labour". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q91).

"Historical data shows that sales have been rising slowly over the recent past. This factor is used to determine current output levels. However, competition may force us to reduce or re-organise these levels. Also, low profitability could stimulate greater output to compensate". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q91).

"Current and expected demand play major roles in the determination of output levels. But skilled labour is always a problem along with finding suitable machinery or equipment to handle the specialised work". (P31; 50; B; MME; Steelwork; PSQ,Q91).

"Demand, warehouse space, material delivery if low stock, labour availability, etc., all affect levels of output to varying degrees". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q91).

"The non-availability of the adjacent quay remains a constant output constraint since it limits severely the amount of work we could take on". (P33; 3; A; MME; Luxury Yachts; PSQ,Q91).

"Long run rising market trends are hopefully assessed and these determine output levels over the foreseeable

future. In the short term, capacity, labour, materials, etc., can cause output levels to be adjusted". (P34; 20; B; EE; Cold Rooms; PSQ,Q91).

"Market demand clearly sets output levels in the first instance, but cash flow, e.g. late payment by customers, plant capacity, etc., are also relevant influences". (P36; 122; C; EE; Communication Equipment; PSQ,Q91).

"A highly significant output determinant in the past has been the new Plymouth plant". (P39; 800; D; TLCF; Footwear; PSQ,Q91).

"Output in the clothing trade has traditionally been market dictated, with such factors as labour flexibility, capacity, etc., constantly causing output level amendments". (P40; 158; B; TLCF; Clothing; PSQ,Q91).

"Long term government contracts for naval uniforms have been the main output determinants here. However, lack of raw materials, and slow movement towards necessary automation have been notable constraints on potential output levels". (P42; 26; D; TLCF; Naval Uniforms; PSQ, Q91).

"In the pottery trade rising market demand in response to new designs must be considered to be the major output determinant. But plant capacity on the one hand, and the results of innovative investment in the previous period on the other, have tended to act as counterbalancing output influences". (P45; 23; C; BPG; Pottery; PSQ,Q91).

"Last year's sales and the season in question determine output levels. Occasionally, the nature of the work, e.g. a too expensive new line, might cause levels to be changed". (P47; 13; B; BPG; Pottery; PSQ,Q91).

"Current demand tends to be the output determinant, with design problems and capacity (if zero excess) acting as occasional influences and constraints". (P49; 19; B; OMG; Blinds; PSQ,Q91).

"A recent influence on output levels has been the purchase of a new machine which flattens out the wrinkles in old cardboard enabling the material to be re-used. Output has thus been raised and savings made. With hindsight, the machine should have been purchased some time ago". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q91).

"Output is fundamentally determined by the length of order books and expected demand. Rising costs of production and inadequate plant capacity are serious constraints". (P51; 3; B; OMG; Ceramic Transfers; PSQ, Q91).

"Labour absenteeism has been a recent constraint on current output levels fixed initially by historical market data". (P52; 22; D; OMG; Coffins; PSQ,Q91).

"Demand determines output levels but recently excess capacity of 25% has affected the scheduling upwards". (P54; 24; B; OMG; Printing; PSQ,Q91).

"An output quota in relation to capacity is fixed at a minimum of 90 vehicle jobs per month. Lack of skilled labour has been a serious output constraint on occasions". (P55; 25; A; OMG; Vehicles; PSQ,Q91).

"Most jobs here are specialist one-offs. Consequently, two usual output constraints are whether a contract is technically feasible, and whether it is cost viable". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q91).

"Historical market demand fixes output and then it tends to be retained over specific periods of time. However, levels can be influenced if the trade cycle, rivalry, the weather, new techniques, etc., are sufficiently significant to warrant changes". (P59; 175; D; OMG; Concrete; PSQ,Q91).

"Long run demand is the major output determinant whilst plant capacity, labour availability, and the trade cycle, are some of the influences and constraints". (P60; 106; C; OMG; Building Materials; PSQ,Q91).

"Output levels here have been motivated by the degree of effective investment over the years, and long run market demand. But the availability of labour over the short term has been a notable influence and occasionally a constraint". (P62; 400; C; OMG; Business Systems; PSQ,Q91).

"Generally, seasonal demand is known enabling quotas to be allocated. But seasonal labour availability is a constraint on output during the winter months". (P65; 30; B; OMG; Tents; PSQ,Q91).

Current and expected demand as measured by the length of order books were clearly regarded as the fundamental determinants of output levels by all firms. However, there were certain reservations particularly by the 15 concerns employing noticeable output rigidity policies. Not surprisingly, there were varying degrees of market consciousness. Firms in category "A" were more aware of market trends than were those in category "D".

But the influences and constraints were rather more complex. After output levels had been determined, it sometimes became necessary to adjust the targets set, e.g. as a result of unpredictable labour shortages. These temporary short run factors were regarded not as determinants but as subsidiary influences of output levels. Of course, it might happen that an influence could become a constraint if the shortage of labour persisted, and even a determinant if permanent. Bearing in mind such complications, Table 8.2 below provides a summary of the responses.

Table 8.2 Most Dominant Output Determinants, Influences, and Constraints. Plymouth Survey

Output Determinants Influences, Constraints.	Employee Groups 0-24	25-99	100-199	200+	Totals
OUTPUT DETERMINANTS	26(100%)	18(100%)	12(100%)	9(100%)	65(100%)
Current and expected market demand; length of order books; seasonal demand; constant output policies, etc.					
Sub-totals:	26(100%)	18(100%)	12(100%)	9(100%)	65(100%)

Table 8.2 (Continued)

Output Determinants Influences Constraints	Employee Groups 0-24	25-99	100-199	200+	Totals
OUTPUT INFLUENCES					
Labour availability	11 (42%)	8 (44%)	4 (33%)	3 (33%)	26 (40%)
Excess capacity	13 (50%)	6 (33%)	4 (33%)	2 (22%)	25 (40%)
Fixed price contracts		1 (5%)			1 (1%)
Weather problems	1 (4%)		1 (8%)		2 (3%)
Economic situation			1 (8%)	1 (11%)	2 (3%)
Poor trade liaison			1 (8%)		1 (1%)
New techniques		1 (5%)	1 (8%)	1 (11%)	3 (5%)
Rival output		1 (5%)		1 (11%)	2 (3%)
Investment (t-1)	1 (4%)	1 (5%)		1 (11%)	3 (5%)
Sub-totals	26	18	12	9	65
OUTPUT CONSTRAINTS					
Plant capacity	10 (38%)	5 (28%)	6 (50%)	4 (44%)	25 (38%)
Labour expertise	1 (4%)	3 (17%)	2 (17%)		6 (9%)
Plant adaption	2 (8%)	3 (17%)			5 (8%)
Rising costs of prod'n	6 (23%)	1 (5%)	1 (8%)	2 (22%)	10 (15%)
Heavy overheads				2 (22%)	2 (3%)
Safety and hygiene				1 (11%)	1 (1%)
Inadequate plant	3 (11%)	2 (12%)			5 (8%)
Warehouse problems		1 (5%)			1 (1%)
Availability of raw materials	1 (4%)	1 (5%)	1 (8%)		3 (5%)

Table 8.2 (Continued)

Output Determinants Influences Constraints	Employee Groups 0-24	25-99	100-199	200+	Totals
OUTPUT CONSTRAINTS (continued)					
Prod'n line loading	1 (4%)	1 (5%)	1 (8%)		3 (5%)
Company non-growth policy		1 (5%)			1 (1%)
Inadequate cash flow			1 (8%)		1 (1%)
Design and technical problems	2 (8%)				2 (3%)
Sub-totals	26	18	12	9	65

Source: Plymouth Survey Questionnaires; Question 91

Labour availability was indeed a major influence on output levels along with the extent of excess capacity. For example, a firm with spare capacity and available labour would be tempted to raise output even if market demand did not warrant such a decision. But other influences tended to be specific or individual, e.g. the weather, fixed price contracts, new techniques, rival output, etc. Significantly, only 3 firms considered that previous investment had had a major influence upon output levels.

As far as constraints were concerned, inadquate plant capacity predominated, with rising costs of production a poor second. Generally, four questions had to be answered: (i) could the product actually be made? (ii) was labour, plant, machinery, and expertise available? (iii) was finance (own preferably) available? (iv) was the capacity right? These constituted the major constraints upon output levels.

However, the whole point of this section of research was to establish whether firms deliberately determined and amended output levels in order to optimise sales in the Baumol tradition or not. The results indicated that very rarely did firms raise or lower output in the short run in a conscious attempt to optimise sales, profits, or even costs. It did appear that output changes in the shorter term were motivated by necessity and not by design. To what extent this approach actually contributes to sub-optimum target returns on capital, or prevents successful returns from being higher, is difficult to appraise. For example, there was no evidence of firms failing to complete and deliver contracts but this is not to imply that problems of financial performance did not exist. Again, whilst companies did not pursue the Baumol hypothesis of sales optimisation, keeping the production line as active as possible appeared to be a major aim, particularly as many of the firms found it difficult to operate consistently at near full capacity. But despite this, there was no evidence of output manoeuvring other than that considered necessary by force of circumstances.

OUTPUT CAPACITY

An optimum size of plant or firm may be defined as "that size of unit which has the minimum average costs of production in the light of its total economic environment", (18) where the environment consists of "the demand conditions facing the firm, the supply conditions of the factors of production facing the firm, any taxes, subsidies, or other type of government interference, and any other factor which may affect the economic operation of the firm" (19). This tends to suggest that optimum size

may not be a given size, but a range of sizes.

In practice the determination of optimum size in an industry is an empirical matter subject to considerable computational difficulties (20). Several approaches have appeared in the literature, and a discussion of the merits or otherwise of various estimation methods is contained in Pratten and Dean (21) and in Pratten (22). The bulk of the evidence for the U.K. which appears in these studies, and which is summarised by Silbertson (23) is based upon the engineering approach.

The "engineering" approach involves estimating what the costs of producing various levels of output will be whether or not the firm is producing at these levels. Past and present cost data serve as a basis for these estimates. The results of engineering studies tend to suggest that the average cost curve of a product initially falls and subsequently levels out. The point at which the curve becomes horizontal is the minimum efficient scale of operation. It will be recalled that Chapter 7 demonstrated such cost curves derived from the Plymouth Survey.

Capacity can be a measure of efficiency. Stigler (24), as mentioned previously, actually defines efficiency as the ratio of:

$$\frac{\text{Actual output}}{\text{Maximum output}}$$

from given resources. Optimum efficiency - a ratio of unity - is achieved when the value of the marginal product of each productive service equals its alternative cost. Of course, different approaches to the measurement of efficiency have also been formulated, e.g. Farrell (25), Farrell and Fieldhouse (26), Downie (27), Dunning and Rowan (28), Williamson (29), Leibenstein (30), and others. However, since a rigorous appraisal of output efficiency of small firms is outside the scope of this work, the

Stigler approach has been adopted.

As far as the Plymouth Survey was concerned, three questions seemed important in the assessment of output efficiency. What was the average level of excess capacity? What percentage of total capacity was needed to produce subsidiary products? And if output were raised to full capacity, what would happen to costs and prices? Maximum excess capacity had to be estimated by the Plymouth Survey firms and was inevitably presented as an average over time. But care was taken to ensure that the figures quoted were indicative of the extra output the firm could produce without recourse to overtime working, excessive demands upon machinery, management, and so on. Similarly, the amount of capacity required to produce subsidiary products, if any, was also an approximation. Finally, the results of the raising of output to full capacity were restricted to the effect upon costs and prices in order to standardise the responses. The following data were obtained.

"We have experienced very little excess capacity, say 5%, since the plant can always be kept fully occupied by health and safety checks, and improvements. We have no subsidiary products as such, but hygiene and research requirements do command about 15% of our resources. If output were raised to near 100% capacity, costs, having stabilised at around 70% capacity, would be unaffected along with prices". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 93, 94, and 95).

"Average excess capacity has been around 25% but this will improve when the work from the run down Tamar Brewery is taken over. Plant capacity is not really involved in subsidiary products, e.g. public houses, but excess capacity, used mainly for storage, could have been more efficiently utilised. Full capacity working, e.g. 95% preferred, would have reduced costs, but price would almost certainly have been retained via the industry price code". (P2; 95; D; FDT; Brewing; PSQ,Q93, 94, & 95).

"Capacity is, in fact, short, and the maximum excess has only been around 5% over the recent past. Subsidiary products take up a negligible part of total resources. Thus, full capacity working would have a nil effect upon prices and costs". (P3; 50; C; FDT; Confectionery; PSQ,Q93, 94, and 95).

"Excess capacity has fluctuated over the years but an average might be around 10%. Subsidiary activities, e.g. research, administration, product development, etc., account for about 10% of capacity. Plant operation at near 100% would simply stabilise costs and prices". (P4; 600; D; FDT; Baby Food; PSQ,Q93, 94, and 95).

"The plant has experienced as much as 40% excess capacity. No subsidiary products are produced but capacity is needed, of course, for administration, etc. Full capacity working might enable average costs to fall but price would be retained, especially if already below the brand leader". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q93, 94, and 95).

"Unused capacity can be widely variable, e.g. from 0% to 50%, due to the nature of the market. About 10% of plant resource is needed to produce subsidiary products - insignificant, but useful. Since output depends entirely on short run demand, full capacity working could not be undertaken over the long run. And costs and prices are obviously conditioned by this situation". (P6; 450; D; FDT; Meat; PSQ,Q93, 94, and 95).

"Excess capacity is seasonal, e.g. 40 hour week in summer, 30 hour week in winter, but average excess works out at about $12\frac{1}{2}\%$. No subsidiary products are produced. Output at a constant 100% capacity would certainly stabilise or even reduce unit costs, but actual price reductions would be unlikely". (P7; 20; C; FDT; Minerals; PSQ, Q93, 94, and 95).

"The plant is of low capacity and efficiency. Thus, excess capacity tends to be negligible. Further, about 20% of this availability is expended on subsidiary products. Costs could only be reduced by greater efficiency rather than full capacity working". (P8; 300; C; FDT; Bread; PSQ,Q93, 94, and 95).

"Seasonal demand has been known to raise excess capacity to 30%. No subsidiary products are undertaken although delivery service does demand some resources. Long run production at full capacity would probably not

affect costs and prices unduly, since we tend to operate on a flat average cost curve". (P9; 15; D; CAI; Fertiliser; PSQ,Q93, 94, and 95).

"Unused capacity has been between 10% and 20% as a general rule. Part of operational capacity is directed towards repairs and maintenance rather than subsidiary products. Costs would not fall too much, and price would be retained even if long term full capacity working were possible". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q93, 94, and 95).

"Average levels of excess capacity have been about 15%, but the range could cover 0% to 40%. Subsidiary activities, e.g. service, taken up a further 10%. If 0% excess capacity could be achieved, this would enable slight price reductions to be made by extending, for example, quantity discounts". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q93, 94, and 95).

"Excess capacity has been as high as 40%, but averaging 10% over time. Capacity is needed for repairs and maintenance, administration, etc., and 10% of resources are allocated for these purposes. If output were raised to full capacity, falling unit costs might permit selected reductions in price". (P12; 8; C; MME; Injection Moulds; PSQ,Q93, 94, and 95).

"Permanent full capacity is not really possible in the steelwork trade, and a 20% excess on average would be regarded as normal. About 5% of plant resources are allocated for subsidiary products. The firm has developed a good reputation for these subsidiaries and although we would gain by actually dropping them, we would not consider this. Average costs would fall if the plant operated at full capacity for a lengthy period. But since this is not feasible, prices tend to be over-optimum". (P13; 170; B; MME; Steelwork; PSQ,Q93, 94, and 95).

"Currently, we have very little excess capacity (5%) but it is the low profit margin which accounts for this. Capacity for subsidiary work is progressively diminishing in favour of more sub-contracting. If we could operate at full capacity permanently, costs and prices would simply be maintained and more subcontracts would be undertaken". (P14; 468; B; MME; Machine Tools; PSQ,Q93, 94, and 95).

"During the occasional crisis period, e.g. 3 day week, unused capacity can be much higher than the 15% average. No subsidiary products are made but an estim-

ated 15% of resources are probably wasted during the working day. Clearly, if excess capacity could be elimated, then unit costs and possibly prices could be reduced". (P15; 14; B; MME; Industrial Signs; PSQ,Q93, 94, and 95).

"Excess capacity is currently nil (1975) but it usually averages 10%. With zero excess capacity we either run down activity or delay contracts if we are unable to accept further orders. The company has no plans for investment to cope with this loss of work. About 15% of capacity is employed on subsidiary products and, again, we have no plans to re-use these resources in favour of work turned away. Full capacity working probably enables costs and prices to be at an optimum but additional output would merely require overtime working and increased wage bills". (P16; 10; C; MME; Press Tools; PSQ,Q93, 94, and 95).

"Unutilised capacity varies between 0% and 30%. With a 20% excess capacity, for example, the firm would operate a 4 day week. But whatever the arrangements, subsidiary products would still command about 10% of resources. Undoubtedly, if plant were operated at full capacity, average costs could be reduced and stabilised". (P17; 90; C; MME; Packaging Machinery; PSQ,Q93, 94, and 95).

"Seasonal excess capacity is experienced with 12 boats in winter and 14 in summer. No subsidiary products are involved. Currently, we are actually at full capacity and costs are presumably already at a minimum". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q93, 94, and 95).

"Excess capacity could be as high as 40% out of season, with subsidiary products commanding about 20% of total resource availability. At full capacity, it is possible to keep costs and prices at a minimum, and this would be preferred". (P19; 60; B; MME; Boats; PSQ,Q93, 94, and 95).

"Currently, we are experiencing some over-capacity by round the clock working which is exerting pressure on limited resources. But usually we have averaged between 10% and 15% excess in the past. About 15% of valuable capacity is required for ancillary products for boats, and although we have considered sub-contracting or purchasing, no decision has been made to date. An increase in output to full capacity would normally reduce costs but during over-capacity periods, this would simply incur

extra expense in the form of increased wages and rising repair bills. Since market demand is known, the solution must be to go ahead with the new factory and raise production to well beyond the current level". (P20; 120; B; MME; Luxury Boats; PSQ,Q93, 94, and 95).

"For the individual operator, excess capacity could actually reach 100% in the short term. Diversification, which is not practised here, would cushion this. On average, unused capacity amounts to about 15%. No subsidiaries are undertaken, which again, could be a mistake. If output were to be maintained at full capacity, costs and prices could certainly be stabilised, and the company could presumably earn more over the longer term at the expense of competitors". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q93, 94, and 95).

"Excess capacity has averaged about 15% over the recent past, with another 15% allocated for subsidiary activities. It would obviously be profitable to drop the production of subsidiaries when nearing full capacity, but this is not actually done. If 100% capacity working could be maintained, or even near to it, overheads would be spread more widely, but prices would probably not be reduced despite the possibility of increased orders". (P22; 21; B; MME; Boats; PSQ,Q93, 94, and 95).

"Excess capacity tends to be permanent at around 25% on average, although it has reached 45%. Subsidiary activities take up approximately 15% of usable capacity and these products are vital to our main activity. They could not be abandoned in favour of more routine production. Full capacity working would enable unit overheads to fall, producing more acceptable profit margins. But price would only be reduced if the market so dictated". (P23; 50; B; MME; Iron Castings; PSQ,Q93, 94, and 95).

"Unused capacity has been as much as 40% on occasions against a desired minimum level of 10%. Subsidiary products which are an essential back-up service, account for about 10% of available resources. Plant operation at full capacity, if it could be achieved for extended periods, might enable prices to be marginally reduced, although we would very likely not do this". (P24; 200; C; MME; Toolmaking; PSQ,Q93, 94, and 95).

"Currently, there is no excess capacity although over the years we have experienced between 5% and 10%. All available resources are employed on main products and no subsidiaries are undertaken. If output could be maintained at the full capacity level then no doubt,

prices could be held". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q93, 94, and 95).

"Unused capacity depends upon certain seasonal factors and has been as high as 40%. But an average might be nearer to 20%. About 15% of resources are required to cope with ancillaries to the main activity, e.g. service. Output levels tend to be relatively small in the normal course of events, but even so, unit costs could be reduced if production were to continue at the full employment level". (P26; 70; A; MME; Trawler Repairs; PSQ,Q93, 94, and 95).

"Average excess capacity has been around 20%, with a maximum level of about 40%. No subsidiary products are undertaken but 5% of resources are needed in order to cope with servicing demands. Owing to the constancy of the average cost curve, unit costs would not change significantly at 100% capacity working". (P27; 40; D; MME; Thermowells; PSQ,Q93, 94, and 95).

"Actual output has occasionally been just 60% of the maximum possible, whilst sometimes it has actually been 100%. But excess capacity over the longer term would be nearer 20%. An estimated 10% of resources is required for work ancillary to the main line. This is regarded as vital and could not be dropped in favour of the more profitable routine output. Since the average cost curve tends to be rather shallow, production at the full capacity level would probably not permit any reduction in price". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q93, 94, and 95).

"Average excess capacity is 10%. Resources needed for subsidiary products amount to 15%. Full capacity working would undoubtedly reduce average costs, but price would very likely be maintained for the extra profit, assuming, of course, that sales at the higher level were guaranteed". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q93, 94, and 95).

"The maximum estimated level of excess capacity has been 40% with about 10% of usable resources allocated for subsidiary work. Output at 100% capacity would reduce average costs and permit lower prices as a result of the overhead rate (250% of labour) being spread more widely". (P31; 50; B; MME; Steelwork; PSQ,Q93, 94, and 95).

"Average excess capacity over the year would be around 10% on an actual/available basis, with up to 15% of resources needed for ancillary services. Round the year working at the full capacity level would marginally lower costs permitting selected price reductions also". (P33; 3; A; MME; Luxury Yachts; PSQ,Q93, 94, and 95).

"Excess capacity tends to fluctuate over the year due to seasonal problems, transport, bad weather, etc., but a rough estimate would be between 10% and 20%. The servicing side does take up some resource which, again, varies from time to time, but say 20% on average. Production at 100% capacity shows that unit costs are pushed downwards or maintained, at least. Price too, could fall albeit marginally". (P34; 20; B; EE; Cold Rooms; PSQ, Q93, 94, and 95).

"Full capacity working has been 100% and has also been 50% in the early days. But a reasonable estimated average would be 25%, although the trend is a falling one. Probably about 15% of capacity is required for servicing, checking, development, etc. If output were raised to the 100% level and maintained, unit costs would probably not fall significantly, but any excess profit made would be used to cut down on bank credit". (P36; 122; C; EE; Communication Equipment; PSQ,Q93, 94, and 95).

"Up to 40% excess capacity has been recorded, but 15% would be a more representative average. About 10% of plant capacity are employed on subsidiary products, although it depends on how these are measured. For example, office intercoms are required as ancillaries, but they are nevertheless valuable orders. Full employment working would reduce unit costs and permit price reductions. However, prices would probably be maintained rather than lowered in order to boost profit". (P37; 27; C; EE; Location Systems; PSQ,Q93, 94, and 95).

"Currently, the plant is fully operational but an average excess capacity might be quoted at 10%. No resources are employed on the production of subsidiary items, but perhaps too much is spent on the administration side. Some wastage could be eliminated. Full capacity working enables costs and prices to be stabilised, but not reduced due to the horizontal nature of the average cost curve". (P39; 800; D; TLCF; Footwear; PSQ,Q93, 94, and 95).

"When excess capacity has been 0% we have simply turned work away. Clearly, an investment programme would

go some way towards solving this problem. However, an average excess has been about 15% with a maximum of 50%. All our work is regarded as main production with no spare capacity to draw on from subsidiaries when resources have been short. It is known that production at the 100% level does keep costs at a minimum which enables better financial planning, etc. But it is doubtful if prices could be reduced at our current 7% profit margin". (P40; 158; B; TLCF; Clothing; PSQ,Q93, 94, and 95).

"Current plant operation is 50% in that resources permit a working week of 4000 hours compared with an actual 2000 hours. One reason for this is that market demand is down by 33⅓% on 1974. Partial recovery could be engineered if costs were lower, but a long term investment programme would be needed for this. Alternatively, permanent full capacity working would do much to stabilise costs and enable prices to be competitive". (P41; 150; C; TLCF; Clothing; PSQ,Q93, 94, and 95).

"Maximum excess capacity has been 40% but government contracts have kept the average down to about 10%. Subsidiary products include badges - a traditional item here - which take up approximately 15% of plant resource. If output could be maintained at full capacity, unit costs would probably be at an optimum but since the average cost curve tends to be somewhat horizontal it is doubtful if prices could be lowered". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q93, 94, and 95).

Excess capacity has averaged around 30% over the years with a further 30% of capacity set aside for ancillary activities such as repairs and respirators, some of which are purchased. If orders permitted full capacity working then we would be prepared to lower prices and pursue a sales policy". (P43; 13; C; TLCF; Wet Suits; PSQ,Q93, 94, and 95).

"Unused capacity has been 50% for some time now mainly as a result of moving into a new factory far too large for current and foreseeable activities. Excess capacity could be, and has been, 100% for one-off jobs. Probably about 10% of capacity is expended on ancillary work, e.g. fitting of shop fronts, which is more profitable than the main dealing in glass. Full capacity working would certainly reduce unit costs especially since current overheads are only serving 50% of plant operation. Despite all this, the company has no plans to eliminate excess capacity or even reduce the scale of operation in the short run". (P44; 45; D; BPG; Glass; PSQ,Q93,94, & 95).

"Out of season, excess capacity can reach 40% but 0% in season. On average about 20% of resources are unused over the longer term. Approximately 10% of capacity is required for subsidiary products which can be dropped during the busy season. Permanent full capacity working would be ideal in that it would permit some degree of price stability or even price reductions". (P45; 23; C; BPG; Pottery; PSQ,Q93, 94, and 95).

"During the summer season excess capacity is down to 0%, but it can be as high as 30% during the winter. Ancillary products account for about 10% of plant resource. The possibility of reducing prices at full capacity working depends on whether the work is specialised or routine. If the former could be undertaken in large batches then costs and prices could be reduced. However, price would probably be maintained in order to increase profit". (P47; 13; B; BPG; Pottery; PSQ,Q93, 94, and 95).

"Excess capacity averages between 15% and 20% over time. Resources allocated for subsidiary products have been up to 20% on occasions but normally about 10% would be allowed for the double glazing section. Plant operation at the 100% level might enable price to be reduced marginally to undercut competition but this would depend on the market at the time". (P49; 19; B; OMG; Blinds; PSQ,Q93, 94, and 95).

"Unused capacity tends to be variable by space, labour, output, etc., but a rough average would be between 10% and 30% over time. No subsidiary products are produced although some capacity has to be used for storage which could be better utlised, especially as no finished stock is kept for local demand. Undoubtedly, full capacity operation would priduce lower unit costs and more competitive prices although the latter would most likely not be reduced". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q93, 94, and 95).

"We have experienced virtually no unused capacity in the recent past although the firm as a unit is basically very small. However, if one takes into account the work we have had to turn down then excess capacity could be said to be high at 20%. A very small amount of plant resource is allocated to subsidiary products as these are not considered to be vital. If the allocation were high then we would simply have to sacrifice this for the more essential main work from time to time. Provided that batches are long, full capacity working can mean optimum unit costs but the opportunity cost of rejecting work

must be excessive". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q93, 94, and 95).

"The average level of excess capacity has been about 10% with a maximum of 40%. Around 10% of capacity is required for subsidiary products but this depends to a large extent upon the state of trade. Full capacity working over the longer term would keep average costs down to a minimum but it is doubtful if price could be reduced". (P53; 20; C; OMG; Furniture; PSQ,Q93, 94, and 95).

"Currently, and over the recent past, we have been operating at around 75% of full capacity, i.e. working 30 hours per week rather than 40. Probably about 20% of total resource is appropriated for ancillary production which is regarded as useful work to fall back on. Permanent 100% capacity operation would be ideal since costs would be lower, but price would almost certainly depend upon the market". (P54; 24; B; OMG; Printing; PSQ,Q93, 94, and 95).

"One hundred vehicle jobs per month are possible with our given resources, but normally we manage to complete about 90 on average, although currently it is 60. Generally, the higher the number of contract jobs secured the lower can be the quoted prices". (P55; 25; A; OMG; Vehicles; PSQ,Q93, 94, and 95).

"Excess capacity has been at a maximum of 40% with an average of around 20%. Full employment working would stabilise costs, i.e. overheads would be spread, but price depends more upon the market rather than costs which are already below the price in mind". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q93, 94, and 95).

"Since negligible production runs are the rule, full capacity working would simply spread the overheads more widely and not cause significant reductions in costs. Prices are based on market demand in any event". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q93, 94, and 95).

"Excess capacity has averaged 25% since 1971. In theory, 100% working would lower costs and prices, but in practice the latter would be retained since temporary extra profit would be regarded as more important than temporary extra sales. Nevertheless, long term sales promotion is a basic aim here". (P61; 124; C; OMG; Joinery Tools; PSQ,Q93, 94, and 95).

"We are a very small firm and any order tends to raise operation to the full capacity level. Currently, however, excess capacity is 10%. Permanent 100% working might permit lower prices to be quoted, but more likely the extra profit would be given priority". (P64; 3; B; OMG; Inflatable Boats; PSQ,Q93, 94, and 95).

"We are subjected to seasonal demand and during the winter excess capacity can be as high as 50%. On average, unused resources could amount to 25%. About one fifth of our work would be regarded as subsidiary but this only requires about 10% of plant facilities. If we could operate at full capacity on a yearly basis, then costs and prices could be more competitive. In the meantime, diversification could ease our excess capacity burden, but no decisions have been taken on this issue to date". (P65; 30; B; OMG; Tents; PSQ,Q93, 94, and 95).

Practically every firm in the sample had experienced some degree of excess capacity over the recent past and occasionally these unused resources had amounted to 50%. No firm could claim continuous zero excess capacity, which incidentally, does link with Chamberlin's "Theory of Monopolistic Competition" (31). Tabular presentations of the foregoing extracts are as follows.

Table 8.3 Estimated Average Levels of Excess Capacity by Size of Firm. Plymouth Survey

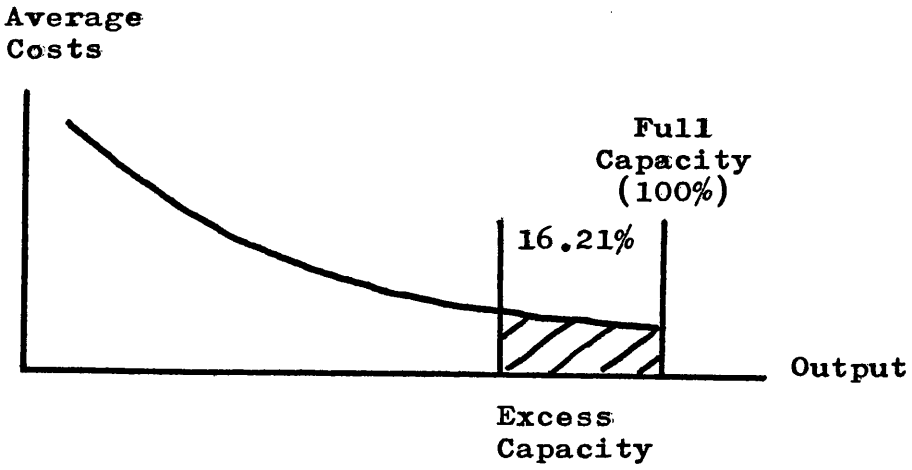
Excess Capacity Levels	Employee Groups 0-24	25-99	100-199	200+	Totals
0% - 5%	3 (11%)	1 (5%)		4 (44%)	8 (12%)
6% - 10%	3 (11%)	4 (22%)	1 (8%)	4 (44%)	12 (18%)
11% - 15%	9 (35%)	2 (12%)	5 (42%)		16 (25%)
16% - 20%	7 (27%)	6 (33%)	3 (25%)		16 (25%)
21% - 25%	3 (11%)	3 (17%)	3 (25%)	1 (11%)	10 (15%)
26% - 30%	1 (4%)				1 (1%)
31% - 35%		1 (5%)			1 (1%)
36% - 40%					
41% - 45%					

Table 8.3 (Continued)

Excess Capacity Levels	Employee Groups 0-24	25-99	100-199	200+	Totals
46% - 50%		1 (5%)			1 (1%)
Totals:-	26	18	12	9	65
Mean Excess Capacity	16.34%	19.72%	18.33%	9.44%	16.21%

Source: Plymouth Survey Questionnaires; Question 93

Fig 8.5 Average Level of Excess Capacity for 65 Firm Plymouth Survey



Source: Plymouth Survey Questionnaires; Question 93

Examining Table 8.3 we observe that 70% of the Plymouth Survey firms recorded average excess capacities of over 10%, whilst only 12% could claim that unused resources were normally below 5%. Also, exactly half of the sample experienced excess capacities within the 10% and 20% range.

Firms with 0-24, 25-99, and 100-199 employees had to cope with excess capacities of 16.34%, 19.72% and

18.33% on average respectively, whilst the firms with over 200 personnel fared rather better with just 9.44%. Incidentally, these results are supported to some extent by Lund and Miner's "Three Studies on Small Firms" (32). Research on capacity utilisation suggested that small firms, i.e. with up to 200 employees, were less prone to cyclical variations than were larger firms. For example, the percentages of firms with over 2,000 employees that reported output being below full capacity reached 82%, 72%, and 73% in the troughs of 1958-59, 1962-63, and 1966-67. But below capacity firms with up to 200 employees reached only 76%, 63%, and 65%, respectively. Similarly, whilst the percentages for the larger firms fell to 39%, 36%, and 34%, in the peaks of 1960-61, 1964-65, and 1968-69, the percentages for the smaller firms fell to only 42%, 38%, and 51% respectively. What emerged from the Plymouth Survey was that for the period 1970-75, the majority of the firms experienced some degree of excess capacity, and the average for the full 65 firm sample was 16.21%.

There did not appear to be any correlation between the level of excess capacity and the achievement of the target rate of return on net assets. For example, some firms in the Plymouth Survey with virtually no excess capacity failed their target return on capital, whilst others were successful, and vice versa. Table 8.4 refers. However, it might be helpful to note at this point that there was a correlation of -0.277 between excess capacity and actual returns on net assets, an issue developed in some detail presently.

Table 8.4 Excess Capacity and the Achievement of Target Returns on Investment for 38 Firm Sample (72-74). Plymouth Survey

Code	Excess capacity	Success or Failure to reach Target Return on Net Assets	Code	Excess capacity	Success or Failure to reach Target Return on Net Assets
P1	5%	Fail	P31	20%	Fail
P2	25%	Fail	P32	15%	Success
P4	10%	Success	P34	15%	Fail
P5	15%	Fail	P35	15%	Success
P6	25%	Fail	P36	25%	Fail
P7	12½%	Fail	P38	20%	Fail
P9	15%	Fail	P39	10%	Fail
P11	15%	Fail	P41	50%	Fail
P14	5%	Fail	P46	20%	Success
P17	15%	Fail	P49	17½%	Fail
P19	20%	Success	P50	20%	Fail
P20	12½%	Fail	P53	10%	Success
P21	15%	Success	P54	25%	Success
P24	10%	Success	P55	10%	Success
P25	7½%	Fail	P57	20%	Success
P26	20%	Fail	P58	20%	Fail
P27	20%	Fail	P61	25%	Success
P28	20%	Success	P62	0%	Success
P30	10%	Success	P65	25%	Fail

Source: Plymouth Survey Questionnaires;
Question 93
Companies House, Annual Returns, London.

Of course, it has already been pointed out that excess capacity was a fairly difficult concept to measure in the light of the differing natures of individual firms in seven separate industries and operating under varying market conditions. Nevertheless, some Stigler (33) ratios were calculated from the data collected and are shown below in Table 8.5

Table 8.5 Stigler Efficiency Ratios Using Excess Capacity Data from the Plymouth Survey

Number of Firms and Percentages	Stigler Formula:- Actual Output / Maximum Output	Stigler Efficiency Ratios
8 (12%)	95/100	0.95
12 (18%)	90/100	0.90
16 (25%)	85/100	0.85
16 (25%)	80/100	0.80
10 (15%)	75/100	0.75
1 (1%)	70/100	0.70
1 (1%)	65/100	0.65
1 (1%)	50/100	0.50

Total:- 65

Source: Plymouth Survey Questionnaires; Question 93

Excess capacities by S.I.C. groupings showed (assuming the data to be acceptable for the purpose) that the B.P.G. group had the highest mean of 26.25% whilst the F.D.T. industry recorded the lowest at 12.18%. It must be remembered, of course, that these data refer only to 1970-75, and other periods could well produce quite different results.

Table 8.6 Estimated Average Levels of Excess Capacity by S.I.C. Groupings. Plymouth Survey

Standard Industrial Classification	Average Excess Capacities	Number of Firms in Groupings
Food, Drink, Tobacco	12.18%	8 (12%)
Chemicals, All'd Inds	15.00%	2 (3%)
Mech. Marine Engin'g	15.17%	23 (35%)
Electrical Engin'g	18.00%	5 (8%)
Text. Leath. Cloth. Foot	18.00%	5 (8%)
Bricks, Pottery, Glass	26.25%	4 (6%)
Other Manf'd Goods	17.08%	18 (27%)
Overall Mean:-	16.21% Total	65

Source: Plymouth Survey Questionnaires; Question 93

Finally, Table 8.7 below analyses capacities by production run categories "A", "B", "C", and "D". Interestingly, but perhaps not surprisingly in view of previous findings, category "A" 14.44% excess capacity emerged as the best; category "D" experienced the worst at 18.84%. Categories "B" and "C" were between these two extremes. Thus, once again, we find that the specialist firms tended to perform rather better than those engaged in extended production runs, i.e. the repeaters.

Table 8.7 Estimated Average Levels of Excess Capacity by Production Run Categories "A", "B", "C", and "D". Plymouth Survey

Production Run Category	Average Excess Capacities	Number of Firms in Category
"A" Specialisers e.g. one-off jobs	14.44%	9 (14%)
"B" Differentiators e.g. small batches	15.95%	21 (32%)
"C" Standardisers e.g. medium batches	16.13%	22 (34%)
"D" Repeaters e.g. long batches	18.84%	13 (20%)
Overall Mean:-	16.21%	Total 65

Source: Plymouth Survey Questionnaires; Question 93

With regard to the percentage of total capacity required to produce subsidiary products, the intention here was to establish the extent of minor diversification to enable working to be as near to full capacity as possible. For example, a firm with a permanent excess capacity of say, 20% might ease the shortfall by extending ancillary production. It appeared that the majority of the sample did have this facility organised to some extent, but

there was no apparent relationship between this and investment performance. For example, some firms with say 10% of capacity allocated for subsidiary work failed their targets, e.g. P11. whilst others with 0% achieved them, e.g. P28. Similarly, some com nies with 0% of total resources appropriated for ancillary production failed their expected returns on capital, e.g. P58, whilst others with say 20% of capacity available for the same purpose actually achieved them, e.g. P54.

Incidentally, the decision to accept subsidiary work (and one-off jobs too) was not always based on profit. Several reasons were given why this type of work was undertaken: (i) to maintain the work flow; (ii) to supplement routine work when excess capacity was high; (iii) to explore the possibility of routine production contracts from one-off prototypes; (iv) to gain potential customers; (v) to acquire experience, expertise, etc., in that line of production; and (vi) to increase profit. The point as issue was whether spare capacity was available or not. We have observed that in the majority of cases, it was. And we have also discovered from the foregoing extracts that if capacity were raised to the 100% level, then unit costs and possibly prices could be reduced, i.e. involving the firm in no financial hardship. Thus, spare capacity was not only available, it would also be profitable to eliminate it. But firms, as shown in previous chapters, seemed reluctant to take advantage of certain profitable opportunities.

The response that full capacity working would be readily undertaken if contracts were available is not necessarily a valid point for a competitive firm to make. For instance, to what extent did firms actively seek out new possibilities and move into and out of reasonably accessible markets? It was, indeed, striking to find

that very few interviewees could confirm that this was done as a specific policy of the firm, although many considered that market seeking could be a profitable venture as the following extracts suggest.

"Market seeking cannot be undertaken as a policy and movement into and out of short run markets would be difficult to implement". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Question 98).
(NB) Excess capacity = 5%

"We have not considered market seeking as a policy or output manipulation". (P2; 95; D; FDT; Brewing; PSQ,Q98).
(NB) Excess capacity = 25%

"Outputs are not changed specifically to increase profitability and new markets are not actually sought after despite the obvious profit potential". (P4; 600; D; FDT; Baby Food; PSQ,Q98).
(NB) Excess capacity = 10%

"Output has to be changeable in the meat trade, but no market seeking, e.g. Europe, has been contemplated to date". (P6; 450; D; FDT; Meat; PSQ,Q98).
(NB) Excess capacity = 25%

"A very small firm in our position cannot move into and out of markets in the short run, nor can it seek out new markets". (P7; 20; C; FDT; Minerals; PSQ,Q98).
(NB) Excess capacity = 12½%

"The product is a standard one and is restricted by quantity and the nature of the firm. Therefore, it is not possible to change outputs or to seek out new markets even for profit". (P9; 15; D; CAI; Fertiliser; PSQ,Q98).
(NB) Excess capacity = 15%

"Output levels could be changed over the short run but the product could not. However, it is not the firm's policy to change output levels without good cause and the amount of market seeking is negligible". (P10; 12; D; CAI; Hydrolised Fats and Oils; PSQ,Q98).
(NB) Excess capacity = 10%

"Short run output levels do tend to be constant and no new markets are consciously sought after to eliminate excess capacity". (P12; 8; C; MME; Injection Moulds; PSQ,Q98).
(NB) Excess capacity = 10%

"It is possible to move into and out of certain short run profitable markets, but the firm does not actually do this as short run output changes are avoided in favour of longer term planning". (P13; 170; B; MME; Steelwork; PSQ,Q98).
(NB) Excess capacity = 20%

"Market seeking to eliminate excess capacity is not practised as a policy although such action might be both possible and profitable". (P15; 14; B; MME; Industrial Signs; PSQ,Q98).
(NB) Excess capacity = 14%

"Output movement into and out of profitable markets is not possible when already at full capacity, and in any event, it is not our aim to expand more than the natural rate of growth. No market research is undertaken". (P16; 10; C; MME; Press Tools; PSQ,Q98).
(NB) Excess capacity = 5%

"No short run market changing is attempted. New markets are not actually sought after – we simply await them. And no advertising or market research is undertaken". (P17; 90; C; MME; Packaging Machinery; PSQ,Q98).
(NB) Excess capacity = 15%

"We could produce a larger boat (42ft X 12ft) at a price of £30,000. In fact, we have had enquiries about this. But we have turned down the idea owing to the lack of capacity. Incidentally, we have no plans to expand in the foreseeable future". (P18; 12; A; MME; Ocean Cruisers; PSQ,Q98).
(NB) Excess capacity = 0%

"Short run output changes are not easy but in winter we engage in work of low material cost to ease liquidity. Apart from this we do not specifically seek out new markets". (P19; 60; B; MME; Boats; PSQ,Q98).
(NB) Excess capacity = 20%

"Output manipulation occurs to the extent that we react to economic conditions. For example, when the economy is in recession, the demand for our luxury boat increases whilst the demand for the standard model declines.

Short run output changes are possible but since capacity can be unreliable, such changes are kept to a minimum". (P20; 120; B; MME; Luxury Boats; PSQ,Q98).
(NB) Excess capacity = 12½%

"Taking advantage of various short run markets can be undertaken if time is available, but not if at full capacity. Normally, market seeking does not take place despite excess capacity and profit potential". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q98).
(NB) Excess capacity = 15%

"It is possible to chase short run profitable markets but we do not actually do this as a policy. Generally, our production levels do tend to be somewhat inflexible". (P22; 21; B; MME; Boats; PSQ,Q98).
(NB) Excess capacity = 15%

"Market research and market seeking might well be profitable ventures but we experience too many constraints to engage in these ourselves. An automated plant might permit such policies however". (P24; 200; C; MME; Tool-making; PSQ,Q98).
(NB) Excess capacity = 10%

"It is not a conscious policy of the firm to move into and out of short run profitable markets - we normally await customer contact and then respond. Further, we do not actually look for new profitable markets beyond basic advertising". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q98).
(NB) Excess capacity = 7½%

"Output manipulation depends on whether the job can be done or not, and on the capacity of the plant. But generally, it is not our policy to actually seek out new markets". (P26; 70; A; MME; Trawler Repairs; PSQ,Q98).
(NB) Excess capacity = 20%

"Generally, it is not possible to move into and out of short run markets. And we have no policy of seeking out new markets. But we do occasionally adopt the policy of accepting orders in the first instance and then looking at capacity to see if the job can be carried out". (P29; 56; C; MME; Waste Disposal Units; PSQ,Q98).

"We did, in fact, change markets recently but this was forced upon us by circumstances. We do not normally engage in market manipulation or seeking out new sales areas". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q98). (NB) Excess capacity = 10%

"Short run market chasing could be profitable but it is not really feasible as a policy here beyond the one-off specialist work we do". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q98).
(NB) Excess capacity = 15%

"We could possibly make more money by some basic advertising but we do not do this as a very small firm". (P33; 3; A; MME; Luxury Yachts; PSQ,Q98).
(NB) Excess capacity = 10%

"The firm has never actually practised short run movements into and out of profitable markets although we could, in fact, do this since the cold room product has great potential and variation". (P34; 20; B; EE; Cold Rooms; PSQ,Q98).
(NB) Excess capacity = 15%

"It is not the firm's policy to seek out short run profitable markets as such". (P35; 20; B; EE; Electric Motors; PSQ,Q98).
(NB) Excess capacity = 15%

"In the main, the market has approached us and we have simply responded. We have never employed a policy of actually seeking out new market areas". (P37; 27; C; EE; Location Systems; PSQ,Q98).
(NB) Excess capacity = 15%

"Short run market manipulation and the seeking out of new outlets are not practised, although such policies could pay". (P39; 800; D; TLCF; Footwear; PSQ,Q98).
(NB) Excess capacity = 10%

"If the plant were automated, market seeking, etc., might be feasible in that stock would be quickly available". (P40; 158; B; TLCF; Clothing; PSQ,Q98).
(NB) Excess capacity = 15%

"Automated machinery — via investment - would be needed if new market areas were to be obtained". (P41; 150; C; TLCF; Clothing; PSQ,Q98).
(NB) Excess capacity = 25%

"It would be impossible to move into new markets with our specialised product, but we could, of course, make alternative clothing". (P42; 26; D; TLCF; Naval Uniforms; PSQ,Q98).
(NB) Excess capacity = 10%

"With an excess capacity of 50% we should be seeking out new market areas. Unfortunately, we are not doing this, or even advertising beyond the Plymouth area". (P44; 45; D; BPG; Glass; PSQ,Q98).
(NB) Excess capacity = 50%

"We do not actually seek out new markets since we are basically a regional operation". (P45; 23; C; BPG; Pottery; PSQ,Q98).
(NB) Excess capacity = 20%

"Despite an average excess capacity of around 20% we do not practise market seeking although out of season work is needed". (P46; 140; C; BPG; Pottery; PSQ,Q98).
(NB) Excess capacity = 20%

"The firm is not really geared for movement into and out of short term markets". (P49; 19; B; OMG; Blinds; PSQ,Q98).
(NB) Excess capacity = 17½%

"The plastic container has great profit potential for us but the decision to actually go ahead with this new product is still awaited". (P50; 44; C; OMG; Cardboard Containers; PSQ,Q98).
(NB) Excess capacity = 20%

"We have been operating in a particular part of the ceramic transfer market and our objectives have been to: (i) sell more to our present customers; (ii) sell to operators in our field who do not actually buy from us; and (iii) sell to operators who are not in our field but could benefit from our service. This is the extent of our market seeking, but this can only be pursued with regard to the very limited resources at our disposal". (P51; 3; B; OMG; Ceramic Transfers; PSQ,Q98).
(NB) Excess capacity = 20%

"Dutch Elm Disease forced us to change the nature of our product and the result has been profitable. But voluntary product development has never been practised". (P52; 22; D; OMG; Coffins; PSQ,Q98).
(NB) Excess capacity = 15%

"In the printing trade firms could move into and out of certain markets and seek out new ones, e.g. by advertising, but unfortunately, we do none of these things". (P54; 24; B; OMG; Printing; PSQ,Q98).
(NB) Excess capacity = 25%

"We could easily move into general engineering to cut our excess capacity and raise profit, but we tend to conveniently remain in vehicles". (P55; 25; A; OMG; Vehicles; PSQ,Q98).
(NB) Excess capacity = 10%

"We have never indulged in market research although, no doubt, if organised properly it could be profitable". (P56; 50; B; OMG; Printing; PSQ,Q98).
(NB) Excess capacity = 10%

"It is not possible for us to seek out new markets and supply that demanded over the short term since our product is a highly specialised one". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q98).
(NB) Excess capacity = 20%

"The market itself determines our operational levels". (P59; 175; D; OMG; Concrete; PSQ,Q98).
(NB) Excess capacity = 15%

"We are currently moving more into D.I.Y. products and out of heavy building materials. But change of policy is a one-off decision rather than a constant assessment of potential markets". (P60; 106; C; OMG; Building Materials; PSQ,Q98).
(NB) Excess capacity = 20%

"Although excess capacity has averaged 25% or so since 1971 we tend not to market seek". (P61; 124; C; OMG; Joinery Tools; PSQ,Q98).
(NB) Excess capacity = 25%

"We could move into and out of certain markets more, e.g. exports, but this has not been actively pursued". (P62; 400; C; OMG; Business Systems; PSQ,Q98).
(NB) Excess capacity = 0%

"Short term manipulation of output levels might be possible, e.g. during the winter recessions, but the firm has tended not to explore this despite the profit potential on the one hand, and average excess capacity of 25% on the other". (P65; 30; B; OMG; Tents; PSQ,Q98).
(NB) Excess capacity = 25%

Many small manufacturing firms are founded and run by engineers, scientists, and technicians, whose whole outlook is coloured by enthusiasm for the technical qualities

of the product, and the concept of the manufacturing process. Factories, machinery, and products are solid and measurable items. Marketing, however, is considerably less so. It is, therefore, much more difficult to control.

But if low priority is given to marketing, and it appears that the Plymouth Survey firms were not that market conscious, then the result is likely to be sluggish sales, excessive stocks, above optimum excess capacity, dissatisfied customers, and, not least, low rates of return on capital.

Most of the Plymouth firms considered that market research, market seeking, and advertising, could lead to increased profits (and reduced excess capacity) but the majority did not, in fact, practise these activities.

But interestingly, there was no significant correlation between this "market attitude" and rates of return on net assets. Certain firms, for example, practised no market seeking, yet reached their target rates of return, e.g. P54, P61. On the other hand, some companies who did make an attempt at market seeking, were not necessarily highly profitable, e.g. P51, P60.

The reluctance to pursue new market opportunities to eliminate excess capacity could be a serious deficiency since when levels of unused capacity and actual rates of return on net assets (as opposed to the achievement of targets) are examined, a negative linear coefficient of correlation of -0.277 exists.

Table 8.8 presents a comparison of rates of return on net assets and levels of excess capacity, whilst Fig 8.6 demonstrates the relationship between these two variables.

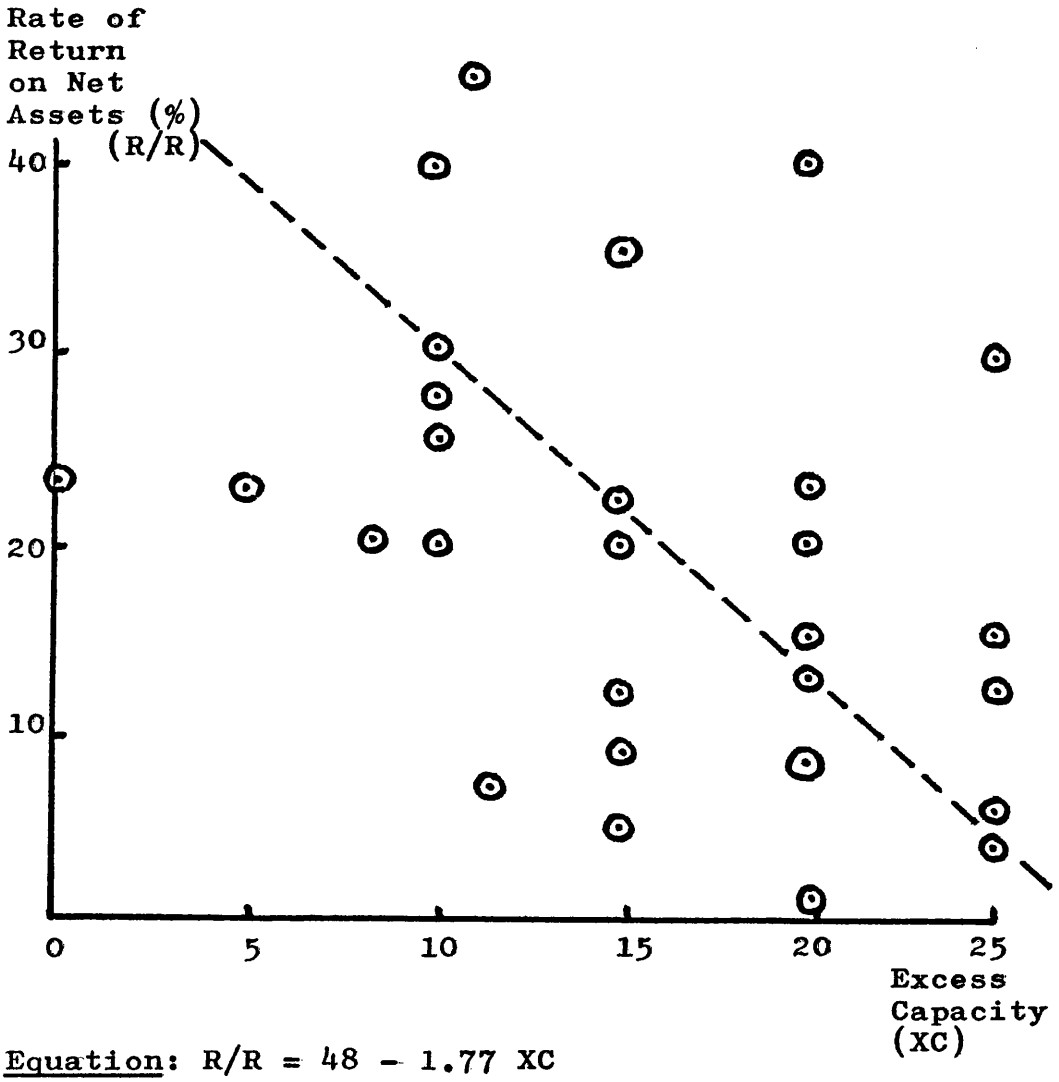
Table 8.8 Returns on Net Assets and Levels of Excess Capacity. Plymouth Survey 38 Firm Sample (72-74).

Code	Rate of Return on Net Assets	Excess Capacity	Code	Rate of Return on Net Assets	Excess Capacity
P1	22.90%	5%	P31	6.41%	20%
P2	4.94%	25%	P32	22.10%	15%
P4	28.99%	10%	P34	11.46%	15%
P5	12.11%	15%	P35	79.85%	15%
P6	12.30%	25%	P36	4.01%	25%
P7	6.99%	12½%	P38	-49.01%	20%
P9	4.59%	15%	P39	20.00%	10%
P11	8.67%	15%	P41	-25.49%	25%
P14	3.69%	5%	P46	20.46%	20%
P17	18.94%	15%	P49	-57.54%	17½%
P19	41.56%	20%	P50	13.28%	20%
P20	47.01%	12½%	P53	104.73%	10%
P21	35.07%	15%	P54	41.37%	25%
P24	41.52%	10%	P55	29.05%	10%
P25	19.68%	7½%	P57	39.72%	20%
P26	1.33%	20%	P58	15.07%	20%
P27	-45.30%	20%	P61	29.27%	25%
P28	23.78%	20%	P62	23.01%	0%
P30	27.02%	10%	P65	15.33%	25%
Means:-				17.33%	16.18%
Standard Deviations:-				29.28	6.42
Covariance:-				-52.23	
Coefficient of Correlation:-				r = -0.277	
				r^2 = 0.0767	

$$r = \frac{-52.23}{(29.28) \times (6.42)} = -0.277$$

Source: Plymouth Survey Questionnaires;
Questions 19, 21, and 93
Companies House, Annual Returns, London.

Fig 8.6 Negative Linear Correlation Between Returns on Net Assets and Excess Capacity. Plymouth Survey 38 Firm Sample (72-74)



Equation: R/R = 48 - 1.77 XC

Correlation: r = -0.277

Source: Plymouth Survey Questionnaires;
Questions 19, 21, and 93
Annual Returns, Companies House, London

Practically every firm held the view that full capacity working would be far more profitable than operating well below it, and the correlation of -0.277 (despite P53's somewhat distortionate rate of return) lends some support

to this. And if one examines the five firms in the 38 firm sample that sustained losses, one finds that they all had above average levels of excess capacity.

Table 8.9 Deficit Companies and Levels of Excess Capacity. Plymouth Survey 38 Firm Sample (72-74)

Code	Return on Net Assets	Excess Capacity
P27	-45.30%	20%
P31	- 6.41%	20%
P38	-49.01%	20%
P41	-25.49%	25%
P49	-57.54%	17½%
Mean for 5 deficit firms (72-74)	-36.75%	20.5%
Mean for full 38 firm sample (72-74)	+17.33%	16.18%
Mean for full 65 firm sample (70-75)	+16.29%	16.21%

Source: Plymouth Survey Questionnaires;
Questions 19, 21, and 93
Companies House, Annual Returns, London

Thus, summarising the capacity utilisation findings we have observed five important results: (i) the average level of excess capacity for the 65 firm Plymouth sample was 16.21% over the period 1970-75; (ii) the majority of the companies were committed to some degree of subsidiary production, but there was no evidence that this was specifically employed for the reduction of excess capacity; (iii) if outputs had been raised to the full capacity level, then the majority of the firms would have suffered no financial hardship, and indeed, almost certainly would have increased profits; (iv) the majority did not undertake profitable market research, market seeking, or even advertising despite persistent excess capacities; and (v) there was no apparent relationship

between the level of excess capacity and the achievement (or otherwise) of target returns on net assets, but there was a negative correlation of -0.277 between excess capacity and actual returns on net assets.

We might, therefore, reasonably conclude, and at the same time have the support of the interviewees themselves, that the financial problems of small firms, e.g. the failing of target returns on investment, or more specifically, the falling short of optimum returns, could almost certainly be eased by the application of basic marketing skills impliedly lacking in the first four mentioned findings above.

OUTPUT GROWTH

One ostensible reason for an output maximisation policy is the desire of firms to establish some degree of control over the markets in which they operate. The smaller a firm's market share, the less influence it has on major industrial decisions, especially price. Growth by greater penetration of its markets thus offers the firm, whatever its size, more "market power". To the extent that a firm can gain or overtake its rivals, it has greater freedom for manoeuvre. It also achieves a stronger position vis-avis competitors, suppliers, and customers.

A second inducement for growth is security. Where security is a consideration to a firm, it is likely to seek growth not just through greater market dominance in its main activity, but through diversification as well. Sometimes the aim for growth by diversification is better balance in a seasonably oriented product line or in a cyclically oriented product line. It is also a hedge against an inevitable showdown in the pricipal product.

Thirdly, the managers could pursue an output growth strategy because of the personal rewards it brings. To have had a part in building a successful dynamic business unit is a direct source of personal satisfaction - a notable point among some of the Plymouth Survey firms. Clearly, an output growth strategy expands the range of opportunities in the technological, marketing, and associated fields.

Undoubtedly, there are other good reasons for a policy of output growth, but the above should be sufficient to indicate that controlled expansion is a desirable goal. Growth and expansion are recurrent themes in annual reports and it receives constant emphasis in the financial pages and the journals. The worth of a firm is measured not so much by current performance as it is by growth potential. Also, far more attention is paid to growth in sales and growth in profit than to the levels of sales and profits. Indeed, a number of models have been developed which suggest that management derives utility from growth. Marris (34), for example, has implied that growth will normally be a major objective of management.

Basically, the concept of a stationary optimum is unacceptable. Managers are well aware of the consequences of stagnation and possible decline. Hence, their main concern, as Baumol (35) points out, should not be at what size their units should finally settle down, but rather how rapidly to grow.

Thus, the Plymouth Survey interviewees were asked if there was a desired output level, or had there been one, beyond the 100% capacity point, and if this had been, or was likely to be, achieved. Alternatively, were growth ambitions simply confined to the status quo? The following extracts refer to these issues.

"The desired amount of output is the full capacity level since output growth beyond this point is constrained by the nature of the market, production, etc". (Code P1; Employees 486; Production Run Category C; S.I.C FDT; Main Activity Food; Source Plymouth Survey Questionnaires, Questions 92 and 97).
% increase in sales 72-73 and 73-74 = 26%
Rate of return on net assets = 22.9%
Target return on net assets = Fail

"We have no plans to move to a more modern plant although this is really required". (P2; 95; D; FDT; Brewing; PSQ,Q92 and 97).
% increase in sales = 8%
Return on net assets = 4.9%
Target = Fail

"Full capacity working is desired, at least, plus the development of new lines. The achievement of output levels beyond this is difficult owing to occasional financial and technical crises". (P4; 600; D; FDT; Baby Food; PSQ,Q92, and 97).
% increase in sales = 8%
Return on net assets = 28.99%
Target = Success

"Sustained production at the full capacity level is a first consideration". (P5; 120; D; FDT; Medicated Pastilles; PSQ,Q92 and 97)
% increase in sales = 83%
Return on net assets = 12.11%
Target = Fail

"Desired levels and actual levels rarely coincide since the latter are set by the market. But output growth is pursued". (P6; 450; D; FDT; Meat; PSQ,Q92 and 9).
% increase in sales = 25% (Pro-growth)
Return on net assets = 12.3%
Target = Fail

"Currently we are cutting back, thus the capacity of 300 doz. bottles per hour must be regarded as the desired output level". (P7; 20; C; FDT; Minerals; PSQ, Q92 and 97).
% increase in sales = 5%
Return on net assets = 6.99%
Target = Fail

"Output targets have been set and achieved over the years but in the short run output tends to remain constant". (P9; 15; D; CAI; Fertiliser; PSQ,Q92 and 97).
% increase in sales = -1%
Return on net assets = 4.59%
Target = Fail

"Output growth is a priority here. Annual budgets are set and, in the main, have been reached despite such problems as labour shortages, strikes elsewhere, etc. But output constancy is preferred over the short run". (P11; 124; C; MME; Valves and Cylinders; PSQ,Q92 and 97).
% increase in sales = 27% (Pro-growth)
Return on net assets = 8.67%
Target = Fail

"Full capacity means 500 machines per year although this has never been achieved permanently, and output growth has been tempered by this". (P14; 468; B; MME; Machine Tools; PSQ,Q92 and 97).
% increase in sales = 14%
Return on net assets = 3.69%
Target = Fail

"The level of activity which utlises the capacity of the plant is the desired level, but this has never been continuously achieved, and, in fact, outputs have been constant in recent years. Our main goal is survival". (P17; 90; C; MME; Packaging Machinery; PSQ,Q92 and 97).
% increase in sales = -2%
Return on net assets = 18.94%
Target = Fail

"Output targets have been achieved in the peak season, and growth has been achieved over the longer term". (P19; 60; B; MME; Boats; PSQ,Q92 and 97).
% increase in sales = 37% (Pro-growth)
Return on net assets = 41.56%
Target = Success

"Known demand tends to set output levels both short and long term. Outputs have been fairly constant in fact". (P20; 120; B; MME; Luxury Boats; PSQ,Q92 and 97).
% increase in sales = 6%
Return on net assets = 47.01%
Target = Fail

"Long term growth has been achieved although short term full capacity working has been erratic". (P21; 1; A; MME; Repairs to Cylinder Blocks; PSQ,Q92 and 97).
% increase in sales = 9% (Pro-growth)
Return on net assets = 35.07%
Target = Success

"Output growth has been achieved in response to rising demand over the years". (P24; 200; C; MME; Toolmaking; PSQ,Q92 and 97).
% increase in sales = 50% (Pro-growth)
Return on net assets = 41.52%
Target = Success

"Growth has been an aim but on completion of phases I, II, and III, sales have settled down, and recently have been falling". (P25; 385; A; MME; Paper Converting Machines; PSQ,Q92 and 97).
% increase in sales = -6%
Return on net assets = 19.68%
Target = Fail

"Survival and reputation are our basic aims". (P26; 70; A; MME; Trawler Repairs; PSQ,Q92 and 97).
% increase in sales = 4%
Return on net assets = 1.33%
Target = Fail

"Growth of sales is desired but this has not been actively pursued and excess capacity has reached 40% on occasions". (P27; 40; D; MME; Thermowells; PSQ,Q92 and 97).
% increase in sales = -31%
Return on net assets = -45.3%
Target = Fail

"Long term growth of output is desired but output levels fluctuate owing to certain constraints peculiar to this trade". (P28; 4; B; MME; Aluminium Castings; PSQ,Q92 and 97).
% increase in sales = 34% (Pro-growth)
Return on net assets = 23.78%
Target = Success

"Demand has been rising and growth is pursued. In the short run, however, output levels do tend to be static". (P30; 30; B; MME; Ford Petrol Engine Conversions; PSQ,Q92 and 97).
% increase in sales = 49% (Pro-growth)

Return on net assets = 27.02%
Target = Success

"Output targets have rarely been achieved along with financial expectations". (P31; 50; B; MME; Steelwork; PSQ,Q92 and 97).
% increase in sales = -31%
Return on net assets = -6.41%
Target = Fail

"Full capacity working is desired but we have to accept whatever the current level is. These levels tend to remain constant in the shorter term". (P32; 140; A; MME; Special Purpose Machines; PSQ,Q92 and 97).
% increase in sales = 46%
Return on net assets = 22.1%
Target = Success

"Long term output growth has been pursued but with some difficulty". (P34; 20; B; EE; Cold Rooms; PSQ, Q92 and 97).
% increase in sales = 11% (Pro-growth)
Return on net assets = 11.46%
Target = Fail

"The maximum use of labour is a desired aim rather than increased output which is difficult in our specialised work". (P35; 20; B; EE; Electric Motors; PSQ, Q92 and 97).
% increase in sales = 26%
Return on net assets = 79.85%
Target = Success

"Growth is desired and the targets set have been reached over time". (P36; 122; C; EE; Communication Equipment; PSQ,Q92 and 97).
% increase in sales = 20% (Pro-growth)
Return on net assets = 4.01%
Target = Fail

"Long term output targets have been set but have not been achieved to date. In the short run, output is fairly stable at £6,000 to £7,000 per month". (P38; 8; B; EE; Control Panels; PSQ,Q92 and 97).
% increase in sales = 29%
Return on net assets = -49.01%
Target = Fail

"Full capacity working is the desired output level although this is not being reached currently. In the short run, output levels do tend to be constant". (P39; 800; D; TLCF; Footwear; PSQ,Q92 and 97).
% increase in sales = 27%
Return on net assets = 20%
Target = Fail

"Full capacity working is probably the maximum we can aim for in the face of current difficulties". (P41; 150; C; TLCF; Clothing; PSQ,Q92 and 97).
% increase in sales = 21%
Return on net assets = -25.49%
Target = Fail

"Output growth has been a pursuable aim and has been fairly successful". (P46; 140; C; BPG; Pottery; PSQ,Q92 and 97).
% increase in sales = 39% (Pro-growth)
Return on net assets = 20.46%
Target = Success

"Occasionally, the target output of 400 units per week is achieved but over the longer term shortfall has been the case". (P49; 19; B; OMG; Blinds; PSQ,Q92 and 97).
% increase in sales = -27%
Return on net assets = -57.54%
Target = Fail

"Full capacity working and longer term growth have been aimed for with occasional setbacks. Output has risen rapidly in the last two years and this has been encouraging". (P50; 44; C; OMG; Cardboard Containers; PSQ,92 and 97).
% increase in sales = 6% (Pro-growth)
Return on net assets = 13.38%
Target = Fail

"The nature of our product and customer (the government) has prevented growth on the one hand, but promoted security on the other". (P53; 20; C; OMG; Furniture; PSQ,Q92 and 97).
% increase in sales = 2%
Return on net assets = 104.73%
Target = Success

"Full capacity working has rarely been reached, and this has inhibited growth ambitions". (P54; 24; B; OMG; Printing; PSQ,Q92 and 97).

% increase in sales = 25%
Return on net assets = 41.37%
Target = Success

"Long term growth has been achieved and plant operation of just below 100% would be desired on a day to day basis". (P55; 25; A; OMG; Vehicles; PSQ,Q92 and 97).
% increase in sales = 2% (Pro-growth)
Return on net assets = 29.05%
Target = Success

"Full capacity working is needed to establish the company and this has not really been achieved to date. But output growth is desired and has been achieved since 1969". (P57; 2; A; OMG; Diamond Wheels; PSQ,Q92 and 97).
% increase in sales = 15% (Pro-growth)
Return on net assets = 39.72%
Target = Success

"Output is not organised on mass production lines and growth is constrained by this. Nevertheless, natural output expansion is encouraged". (P58; 17; A; OMG; Plastic Mouldings; PSQ,Q92 and 97).
% increase in sales = 13% (Pro-growth)
Return on net assets = 15.07%
Target = Fail

"Long term output expansion is hoped for to increase our market share, but in the short run output tends to be constant". (P61; 24; C; OMG; Joinery Tools; PSQ,Q92 and 97).
% increase in sales = 40% (Pro-growth)
Return on net assets = 29.27%
Target = Success

"Once a particular size has been reached, output growth has to be contained to avoid overtrading, and currently, output levels are fairly constant in volume terms". (P62; 400; C; OMG; Business Systems; PSQ,Q92 and 97).
% increase in sales = 22%
Return on net assets = 23.01%
Target = Success

"Seasonal factors effectively inhibit major long term output growth decisions". (P65; 30; B; OMG; Tents; PSQ,Q92 and 97).
% increase in sales = -16%

Return on net assets = 15.33%
Target = Fail

In essence, only 43% of the 65 Plymouth sample could be described as "growth conscious" and this was fairly representative of employee groups 0-24, 25-99, and 100-199. But group 200+ fared even worse with 22% only. However, this might be explained by these larger firms having already grown and reached an optimum size for the time being. Table 8.10 refers.

Table 8.10 Output, Sales, Expansion Policy. Plymouth Survey

Policy	Employee Groups				
	0-24	25-99	100-199	200+	Totals
Sales growth; Output maximisation; Increased market share; Expansion; Ploughback; Competitive prices for market share etc.....	12 (46%)	9 (50%)	5 (42%)	2 (22%)	28 (43%)
Other policies, e.g. Basic profit; Quality product; Survival, etc.....	14 (54%)	9 (50%)	7 (58%)	7 (78%)	37 (57%)
Totals:-	26	18	12	9	65

Source: Plymouth Survey Questionnaires;
Questions 10, 11, 92, and 97

In a study undertaken by Boswell (36) 50% of his sample of small firms sought to put growth first - a percentage which compares acceptably with the above 43%. Not only were the sales targets of Boswell's firms above historical inflation, they also talked about concrete expansion

plans for new plant, diversification, product development, and so on. But significantly, they all took an increase in sales as the acid test - again as per Plymouth Survey.

A further group (20%) mostly sought expansion but their sales ambitions were low. Among their reasons for excluding substantial growth were labour problems, difficutlies in acquiring new premises, and the fear of losing personal control. Mainly, they wanted to digest previous growth, to pursue a policy of retrenchment and reform, to achieve greater profitability and efficiency by means of better techniques and controls, or even slimming down in size.

In sharp contrast with both these groups the remaining 30% were basically pursuing purely conservation and survival goals. Their overriding priority was a preservation of the status quo. In fact, since several firms were given the benefit of the doubt when growth ambitions were discussed, it could well be that 40% of Boswell's sample were non-growth conscious and wedded to conservation.

Boswell further found that very broadly the more profitable firms were biassed towards expansion. This also corresponds with the Plymouth findings in that the 38 firm abridged sample produced the results in Table 8.11.

Out of the 15 firms (40% of the 38 firm sample) who were growth conscious, 9 (60% of the 15) successfully achieved their target returns on net assets. The average increase in sales and the average return on net assets over the period 1972-73 and 1973-74 were 25.13% and 23.48% respectively. In contrast, out of the 23 non-growth conscious firms, only 6 (27% of the 23) reached their targets - the average increase in sales, and

the average returns on net assets for the same periods being only 10.26% and 12.77%. It seems reasonable to suppose from these figures, and from Figure 8.7, that it pays to adopt a growth policy. Unfortunately, too few Plymouth Survey firms were taking advantage of this, and suffering a contribution to sub-optimum returns on investment as a result.

Table 8.11 Growth Conscious Firms' Sales, Returns on Net Assets, and Target Performances. Plymouth Survey 38 Firm Sample (72-74)

	Number of Firms	Number of Firms Achieving Target R/R on Net Assets	Average % increase in Sales 72-74	Average % Returns on Net Assets 72-74
Growth-conscious firms	15 (100%)	9 (60%)	25.13%	23.48%
Non-growth conscious firms	23 (100%)	6 (27%)	10.26%	12.77%
Totals:-	38	15		

Source: Plymouth Survey Questionnaires; Questions 11, 19, 21, and 92. Companies House, Annual Returns, London.

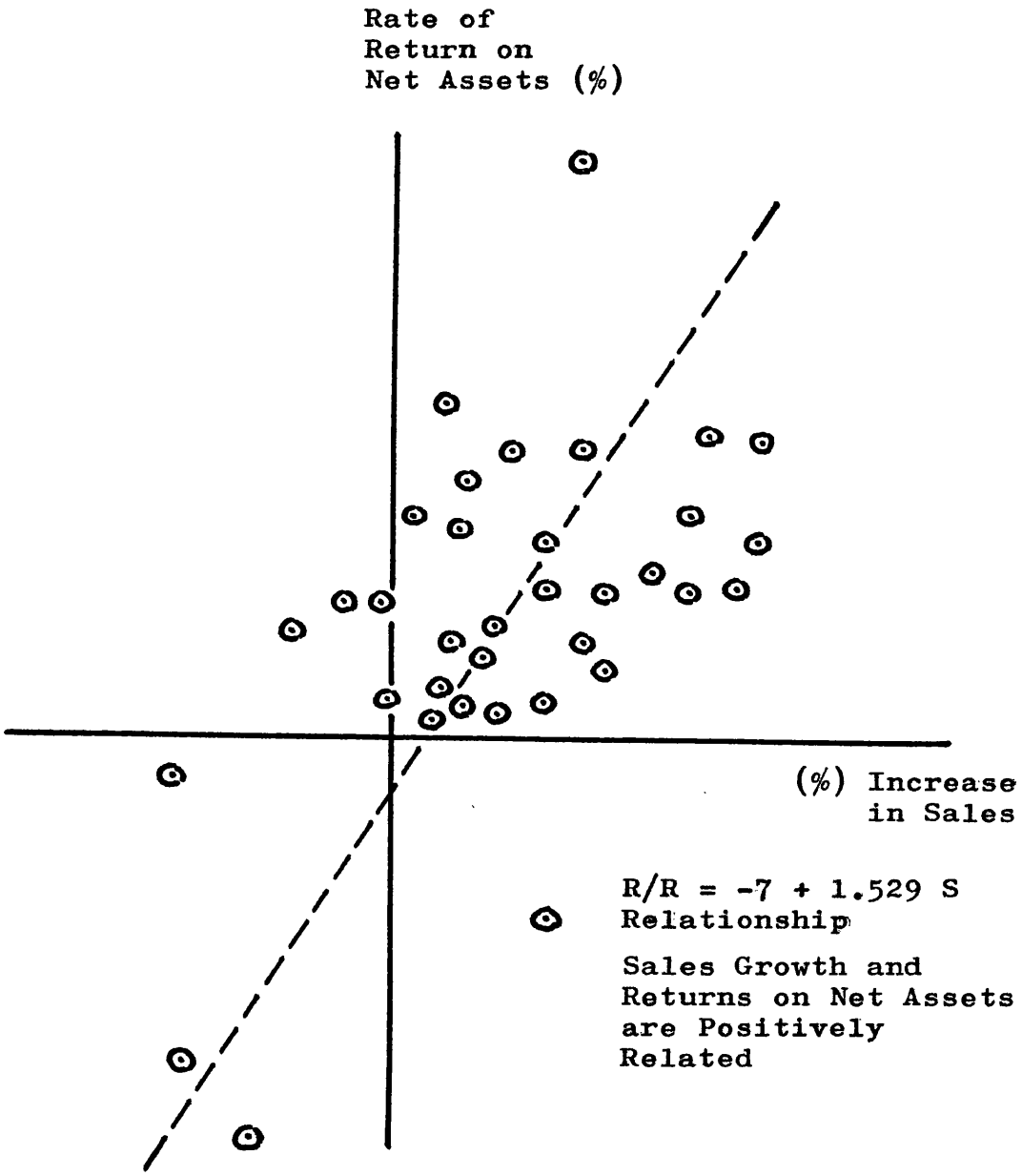
However, in defence of this reluctance to accord priority to expansion, increasing the growth rate is argued to be costly in terms of profits so that more and more growth may depress the stockmarket value of the company below the level that could potentially be gained. Fear of being taken over, if stock market values are too far depressed, might prevent a total commitment to growth. So a link between growth rates and share prices was needed, and Marris (37) develops this by his "steady state" growth

model. It is assumed that once the growth rate is established (which stays constant through time) all the main variables (sales, profits, assets, etc.) grow at the given rate. But the firm can choose between many different growth rates. Higher growth rates will involve more time and effort (and, therefore, expense) in searching for profitable ventures, may involve more advertising to increase demand and more research and development. So the higher the growth rate, the higher the proportion of current profits which will have to be retained to finance these growth promoting activities and so finance the investment needed for extra capacity.

Retaining more profits to finance faster growth necessarily reduces the current dividend which harms the share price. But the higher growth rate achieved implies that dividends also grow at this higher rate. This should boost the share price. To summarise: increasing the growth rate has two effects with opposite results on the share price - the lower current dividend decreases the value of the shares, while the higher growth rate increases it. These two effects need not exactly balance. Marris shows that eventually higher growth rates will have a net depressing effect on share prices. For example, in theory, at high enough growth rates all profits will have to be retained and there will be no dividend at all causing share prices to fall to zero. Consequently, when firms select a growth rate they are also selecting a market valuation.

An alternative growth model has, of course, been developed by Baumol (38) in which he explores the implications of firms wanting to maximise the growth rate of sales revenue. This model has been extended by Williamson (39) to compare the results of maximising profits, growth, and sales. Among the more interesting results

Fig 8.7 Positive Relationship Between the Rate of Increase in Sales and the Rate of Return on Net Assets 1972-74. Plymouth Survey 38 Firm Sample.



Source: Plymouth Survey Questionnaires;
Questions 11, 19, 21, and 92.
Companies House, Annual Returns, London

that Williamson derives, as summarised by Hawkins (40) are that: (i) growth will be limited by the fear of take-over as Marris has claimed and not by lack of funds as Baumol held; (ii) the static sales-maximisation model cannot be derived from growth maximisation, but it can be derived from long run sales maximisation; and (iii) profit and growth-maximisers choose the same output levels but a sales maximiser will produce more. All the growth models of firms assume that expansion costs money and that the faster the growth rate, the more expansion will cost. This is necessary to stop firms doing everything that is profitable at once. The case for this assumption was orginally made by Penrose (41) and has been discussed at length by Marris (42).

As for the motivation aspect one might question why small firms would want the growth rate to be constant - they might prefer to grow faster now, and more slowly later. Indeed, in a world where even the simple techniques of maximising profits are argued to be largely unknown, are firms likely to possess the level of technique needed to solve a steady-state growth model? It is doubtful - from the Plymouth Survey findings - if they would even have the necessary data for the task.

Nevertheless, one would expect all firms to include <u>some</u> element of growth in their overall priorities notwithstanding the results on horizontal investment contained in Chapter 3. Unfortunately, it appeared that rather too many of the Plymouth Survey firms, i.e. 57% of the 65 firm sample, were by no means as resolute in this respect as might have been expected, and especially since the positive relationship between sales and profits as shown by Figure 8.7, cannot be ignored.

SUMMARY

OUTPUT FIXING Just under 30% of the 65 firm sample scheduled output in response to market forces implying reasonable degrees of flexibility. Almost 50% fixed output simply by allocating quotas which were then retained until events dictated otherwise. But 15 firms (23%) displayed a marked "output rigidity" approach, inevitably hindering the long term optimisation of returns on investment.

OUTPUT RIGIDITY AND THE "S-SHAPED" SUPPLY CURVE It emerged that the supply curve possessed a perfectly inelastic section indicating output rigidity at the output level in question. In short, the supply curve was "S-shaped" which coincided with the "Z-shaped" demand curve - two concepts not used in the literature. Out of the 15 firms (23%) employing constant output policies, 7 were part of the 38 firm sample. And 6 of these 7 failed to reach their target returns on net assets.

OUTPUT DETERMINANTS, INFLUENCES, AND CONSTRAINTS Current and expected demand, as measured by the length of order books, were fundamental determinants of output levels, whilst labour availability and excess capacity emerged as major influences. As far as constraints were concerned, inadequate plant predominated with rising costs of production a poor second. Results indicated that very rarely did firms raise or lower output in the short run in a conscious attempt to optimise sales, profits, or even costs.

OUTPUT CAPACITY The average level of excess capacity for the 65 firm sample was 16.21% over the period 1970-75

with some firms experiencing 50% of unused resources. The majority of the companies were committed to some degree of subsidiary production, but there was no evidence that this was specifically employed for the reduction of excess capacity. If outputs had been raised to the full capacity level, then the majority of the firms would have suffered no financial hardship, and almost certainly would have increased profits. The majority, also, did not undertake market research, market seeking, or even advertising despite persistent excess capacity. And although there was no apparent relationship between the level of excess capacity and the achievement (or otherwise) of target returns on net assets, there was a negative correlation of -0.277 between excess capacity and actual returns on net assets. Interviewees themselves supported the view that the falling short of optimum returns could almost certainly have been eased by the application of basic marketing skills impliedly lacking.

OUTPUT GROWTH Out of the 38 firm sample covering 1972 to 1974, 15 companies were growth conscious. And 9 of these 15, i.e. 60%, successfuly achieved their target returns on net assets. The average increase in sales and the average return on net assets over the period 1972-73 and 1973-74 were 25.13% and 23.48% respectively. In contrast, out of the 23 non-growth conscious firms, only 6 (27%) reached their targets - the average increase in sales, and the average return on net assets for the same period being only 10.26% and 12.77%. A growth policy seemed to pay, but too many Plymouth Survey firms were irresolute in this respect.

REFERENCES

(1) E. Ames, "Soviet Economic Processes", Irwin, Homewood, Ill., 1965, reprinted in G. C. Archibald (Ed) "The Theory of the Firm", Penguin Books, Harmondsworth, 1971.

(2) M. J. Kafoglis, "Output of the Restrained Firm", American Economic Review, Sept. 1969.

(3) H. Averch and L. L. Johnson, "Behaviour of the Firm Under Regulatory Constraint", American Economic Review, Dec. 1962.

(4) Kafoglis, American Economic Review, Sept. 1969.

(5) J. L. Stein and G. H. Borts, "Behaviour of the Firm Under Regulatory Constraint", American Economic Review, Dec. 1972.

(6) A. Hankinson, "Investment, Price, and Output Decision Making in the Small Firm", (incorporating The Greater Manchester Study), M.Phil. thesis, Southampton Univ. 1974, (unpublished as at 1977).

(7) D. R. Roberts, "Executive Compensation", Free Press, Glencoe, Ill., 1959.

(8) J. W. McGuire, et al., "Executive Incomes, Sales, and Profits", American Economic Review, Sept. 1962.

(9) W. J. Baumol, "Economic Theory and Operations Analysis", 3rd. Ed., Prentice Hall, Englewood Cliffs, N.J., 1972.

(10) W. J. Baumol, "On the Theory of Oligopoly", Economica, 1958.

(11) W. J. Baumol, "Business Behaviour, Value, and Growth", Macmillan, New York, 1959.

(12) W. G. Shepherd, "On Sales Maximising and Oligopoly Behaviour", Economica, 1962.

(13) C. J. Hawkins, "On the Sales Revenue Maximisation Hypothesis", Journal of Industrial Economics, April, 1970.

(14) R. Rosenberg, "Profit Constrained Revenue Maximisation: Note", American Economic Review, March 1971.

(15) M. H. Peston, "On the Sales Maximisation Hypothesis", Economica, May 1959.

(16) M. Hall, "Sales Revenue Maximisation - An Empirical Examination", Journal of Industrial Economics, April 1967.

(17) B. D. Mabry and D. L. Siders, "An Empirical Test of the Sales Maximisation Hypothesis", Southern Economic Journal, Jan. 1967.

(18) T. R. Saving, "Estimation of Optimum Plant Size by the Survivor Technique", Quarterly Journal of Economics, Nov. 1961, p 569.

(19) Saving, Quarterly Journal of Economics, Nov. 1961, pp 569-570.

(20) Saving, Quarterly Journal of Economics, Nov. 1961, pp 570-572, and A. Silbertson, "Economies of Scale in Theory and Practice", Economic Journal, special issue, March 1972, pp 369-391.

(21) C. Pratten and R. Dean, "The Economies of Large Scale Production in British Industry", Dept. of Applied Economics, Occasional Paper No. 3, Cambridge U.P., 1965.

(22) C. Pratten, "Economies of Scale in Manufacturing Industries", Dept. of Applied Economics, Occasional Paper No. 28, Cambridge U.P., 1971.

(23) Silbertson, Economic Journal, special issue, March 1972, pp 369-391.

(24) G. J. Stigler, "The Theory of Price", Macmillan, New York, 1960, p 102.

(25) M. J. Farrell, "The Measurement of Productive Efficiency", Journal of the Royal Statistical Society, Series A, 1957.

(26) M. J. Farrell and M. Fieldhouse, "Estimating Efficient Production Functions Under Increasing Returns to Scale", Journal of the Royal Statistical Society, Series A, 1962.

(27) J. Downie, "The Competitive Process", Duckworth, London, 1958.

(28) J. H. Dunning and D. C. Rowan, "Inter-Firm Efficiency Comparisons: U.S. and U.K. Manufacturing Enterprises in Britain", Banca Nazionale Del Lavoro, June 1968.

(29) O. E. Williamson, "Economies as an Anti-Trust Defense: The Welfare Trade-Offs", American Economic Review, Vol. 58, March 1968.

(30) H. Leibenstein, "Allocative vs X-Efficiency", American Economic Review, June 1966.

(31) E. H. Chamberlin, "The Theory of Monopolistic Competition", Harvard U.P., Cambridge, Mass., 1933.

(32) P. Lund and D. Miner, "Three Studies on Small Firms", Committee of Inquiry on Small Firms, Research Report No. 11, H.M.S.O., 1971.

(33) Stigler, "The Theory of Price", Macmillan, 1960.

(34) R. Marris, "The Economic Theory of Managerial Capitalism", Macmillan, London, 1964.

(35) W. J. Baumol, "On a Theory of Expansion of the Firm", American Economic Review, Dec. 1962, pp 1078-1087.

(36) J. Boswell, "The Rise and Decline of Small Firms", George Allen and Unwin, 1973, p 31.

(37) R. Marris, "The Economic Theory of Managerial Capitalism", Macmillan, London, 1964.

(38) W. J. Baumol, "On the Theory of Expansion of the Firm", American Economic Review, Dec. 1962.

(39) J. H. Williamson, "Profit, Growth, and Sales Maximisation", Economica, Feb. 1966.

(40) C. J. Hawkins, "Theory of the Firm", Macmillan, London, p 79.

(41) E. T. Penrose, "The Theory of the Growth of the Firm", Blackwell, Oxford, 1959.

(42) R. Marris, "The Economic Theory of Managerial Capitalism", Macmillan, London, 1964.

CHAPTER 9
INVESTMENT ACCOUNTING RELATIONSHIPS

CHAPTER 9
INVESTMENT ACCOUTING RELATIONSHIPS

INTRODUCTION

Disagreement has always existed on the methods of measuring the overall performance of firms. It is relatively easy to measure the productivity of labour in terms of standard times. But such measures are too narrow in concept to take into account capital and material costs. Fortunately, from the experience of the Plymouth Survey, small firms do not need to concern themselves unduly about this sort of difficulty of measurement. What appeared to matter was not so much the comparison between different companies but the trend within each individual firm. Is the firm's financial performance rising or falling? Is the firm's productivity going up or down?

A crude index, better than none, is to measure output in terms of sales turnover and to measure input in similar simple terms. However, sales turnover can be an unreliable measure. Firstly, if the stocks of finished goods fluctuate, sales turnover may represent more than, or less than, the value of the goods produced. Secondly, sales turnover may increase or decrease simply because the material cost, as a proportion of sales, varies from year to year. Material costs may vary depending upon the material prices and the mix of different products.

A more reliable measure than sales turnover is

value added, i.e. the difference between the value of the goods produced and the cost of the materials consumed in manufacturing those goods. However, even here comparisons can be misleading unless one compares like with like. It is safer and often sufficiently enlightening to examine the trend of value added per £1 of labour and per £1 of capital employed over the past few years.

As far as profitability is concerned, absolute figures can be meaningless unless related to the size of the business and, indeed, to inflation. Hence, profitability is a ratio. It is the relationship between the amount of profit and some measure of the size of the firm such as sales, number of employees, or particularly, capital employed.

Thus, bearing in mind both the strengths and weaknesses of investment accounting relationships, the following "capsules" are presented not only to supplement and support the findings of foregoing chapters, but also to highlight possible areas of further research.

CAPSULE I
INVESTMENT INCONSISTENCY

"Profit optimality demands a conscious effort on the part of the decision maker and this would require among a whole range of techniques and goals a well defined and implemented investment strategy.....70% of all capital expenditure had been horizontal over the period under review.....Piecemeal investment was popularly practised and even where vertical strategies were apparent they had been imposed, in the main, be necessity.....There was little evidence of positive investment thinking.....

.....Very few of the smaller firms admitted to planning beyond 12 months and merely invested when the need arose". (Chapter 3; pp 74-80).

Table 9.1 Average Levels of Real Investment by Size of Firm. Plymouth Survey Full Sample.

Size of Firm	1975	1974	1973	1972	1971
0 - 24	£1818	£1752	-£2408	£2412	£1044
25 - 99	£12506	£16368	-£1777	£1723	-£200
100 - 199	£22829	£10080	£22520	£29125	£13718
200 +	£83564	£72255	£56066	£47980	£85301

Source: Plymouth Survey Questionnaires; Questions 21 & 25 Companies House, Annual Returns, London.

Fig 9.1 Inconsistency of Average Levels of Real Investment by Size of Firm During 1971-75. Plymouth Survey Full Sample.

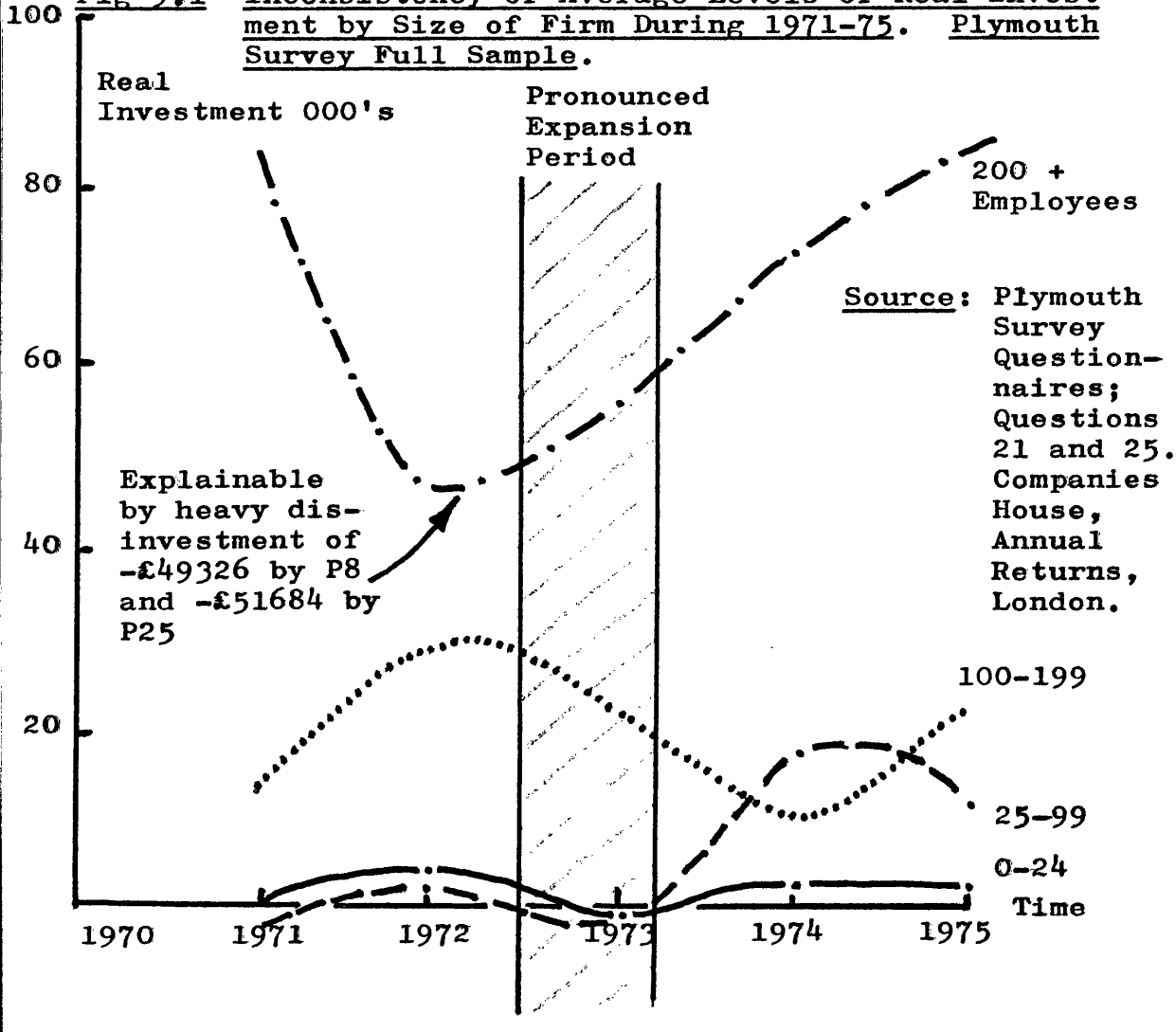
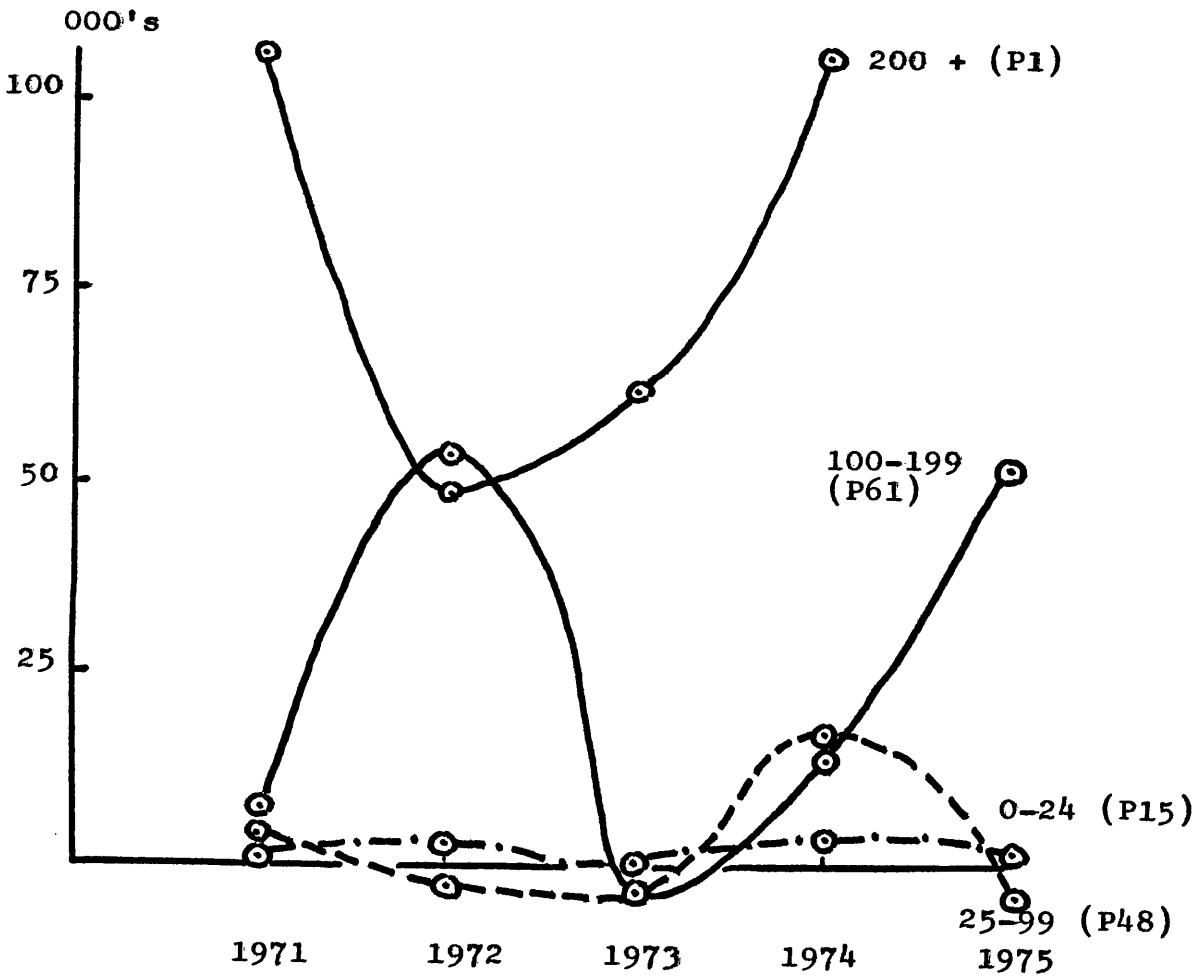


Table 9.2 Actual Levels of Real Investment for 4 Specimen Firms During 1971-75. Plymouth Survey

Code	Lab'r	1975	1974	1973	1972	1971
P15	14	£1615	£2819	£480	£2583	£1582
P48	25	-£2499	£15963	-£364	-£200	£3958
P61	124	£52453	£14081	-£392	£54693	£5229
P1	486		£106658	£61909	£49775	£107797

Source: Plymouth Survey Questionnaires; Questions 21 & 25
Companies House, Annual Returns, London.

Fig 9.2 Inconsistency of Actual Levels of Real Investment for 4 Specimen Firms During 1971-75. Plymouth Survey



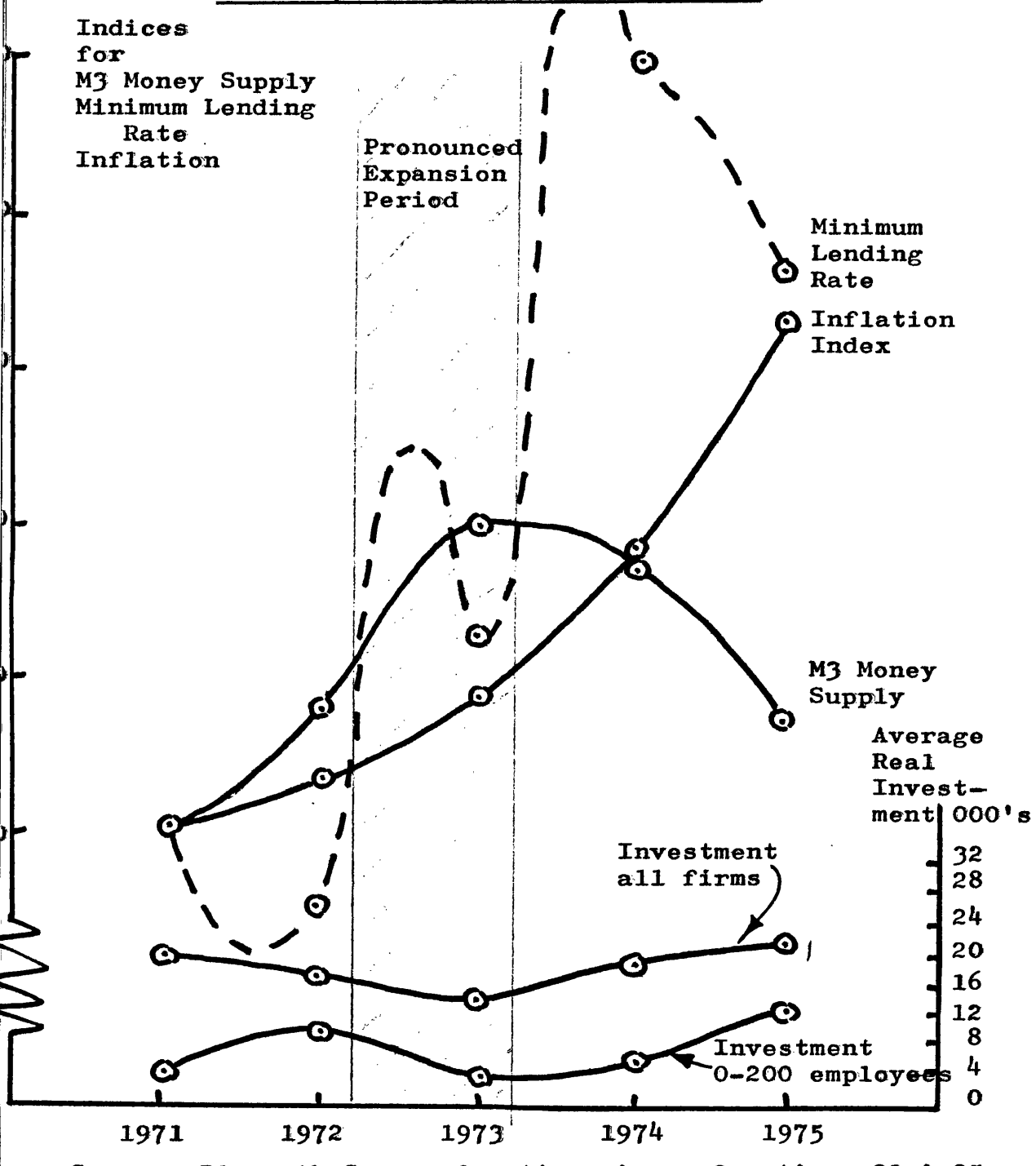
Source: Plymouth Survey Questionnaires;
Questions 21 and 25
Companies House, Annual Returns, London.

COMMENT Sustained investment programmes were certainly not in evidence over the period and, indeed, the four sizes of firm showed notable inconsistencies. During the pronounced monetary expansion period, for example, real investment for the 0-24 employee firms stabilised; for group 25-99 is declined then increased; for group 100-199 it declined; and for group 200+ it increased significantly. Investment did tend to be piecemeal with little evidence of strategic planning as demonstrated by firms P1; P15; P48; and P61.

CAPSULE II
INVESTMENT AND THE ECONOMIC CLIMATE

"During recessionary conditions it is perhaps natural for firms to claim that investment is low as a result of future uncertainty.....But did firms take the opposite view when industrial conditions were favourable? .....31% of the sample believed that general economic conditions and lack of government action were responsible for their investment problems.....Whilst there was little doubt that a recessionary economic situation affected the decision to invest, it was equally clear that other and perhaps more basic factors were relevant .....The impression was that investment by many of the firms would have been sub-optimum irrespective of the economic climate.....In most cases individual investment problems could have been tackled more by resolute management than by arbitrary economic upturns". (Chapter 3; pp 88-100).

Fig 9.3 Non-Positive Relationship Between Average Levels of Real Investment (Plymouth Survey Full Sample) and Real M3; the Minimum Lending Rate; and Inflation, During the Period 1971-75.



Source: Plymouth Survey Questionnaires; Questions 21 & 25
Bank of England Quarterly Bulletins, 1971-75
Economic Progress Reports, 1971-75
Companies House, Annual Returns, London

Table 9.3 Average Levels of Real Investment (Plymouth Survey Full Sample); Real M3 Index; Minimum Lending Rate Index; and Rate of Inflation During 1971-75

	1975	1974	1973	1972	1971
Average Real Investment Full Sample.	£22527	£21480	£14088	£17337	£19704
Average Real Investment Group 0-200 only.	£12354	£6249	£4621	£9855	£4900
Real M3 £000's.	£20213	£24268	£25037	£21386	£17879
Real M3 Index.	113	135	140	119	100
Average Minimum Lending Rate.	11½ 10	11½ 12	13 7½	9 5½	5 6
M.L.R. Index.	191 166	191 200	216 125	150 91	83 100
Inflation 1970 Base. (Retail Price Index)	190.9	153.7	132.4	121.2	113.2
Inflation 1971 Base.	168	135	116	107	100

Source: Plymouth Survey Questionnaires; Questions 21 & 25
Bank of England Quarterly Bulletins, 1971-75
Economic Progress Reports, H.M.S.O., 1971-75
Companies House, Annual Returns, London.

COMMENT It is clearly observable that between 1971 and 1973 which might be regarded as broadly expansionary, the average level of real investment declined both for all firms, and for companies with 0-200 employees only. From 1973 onwards when recessionary conditions developed, real investment actually increased. It would appear that the "economic climate" and real investment by the Plymouth Survey firms were not positively correlated, and the hypothesis contained in Chapter 3, pages 88-100 was

very largely supported.

CAPSULE III

INVESTMENT AND PAST PROFIT

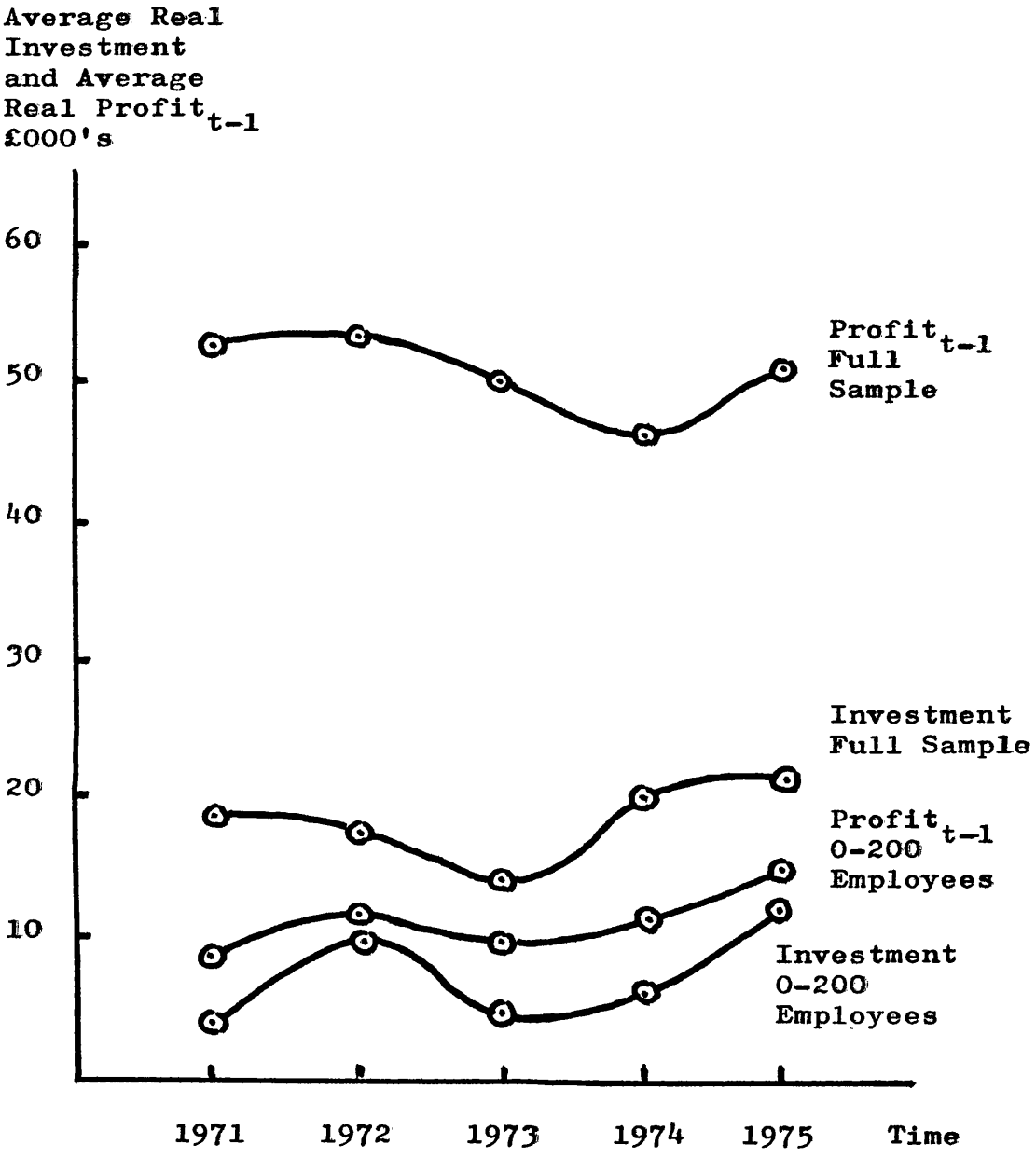
"Some firms said that they would not invest if their own funds were not available, whilst others ploughed back into equipment or reserves almost irrespective of requirements.....Most firms were aware of the importance of replacement in particular, and depreciation covering in general.....But the main indication was that profit led to investment although rarely in the very short term.... ....To state that investment was low was simply another way of saying that profits, i.e. funds available, were depressed.....As far as small companies were concerned it remained true that provided that new plant or machinery were required in the normal course of events, large ex-ante profits were likely to influence investment far more than any other factor". (Chapter 3; pp 111-112).

Table 9.4 Average Levels of Real Pre-Tax Profit and Average Levels of Real Investment (Plymouth Survey Full Sample) 1970-75

	1975	1974	1973	1972	1971	1970
Ave. Real Investment Full Sample.	£22527	£21480	£14088	£17337	£19704	
Ave. Real Investment 0-200 Employees.	£12354	£6249	£4621	£9855	£4900	
Ave. Real Profit Full Sample.	£45640	£51524	£46036	£50152	£53360	£53360
Ave. Real Profit 0-200 Employees.	£18552	£14198	£11561	£10104	£11476	£9441

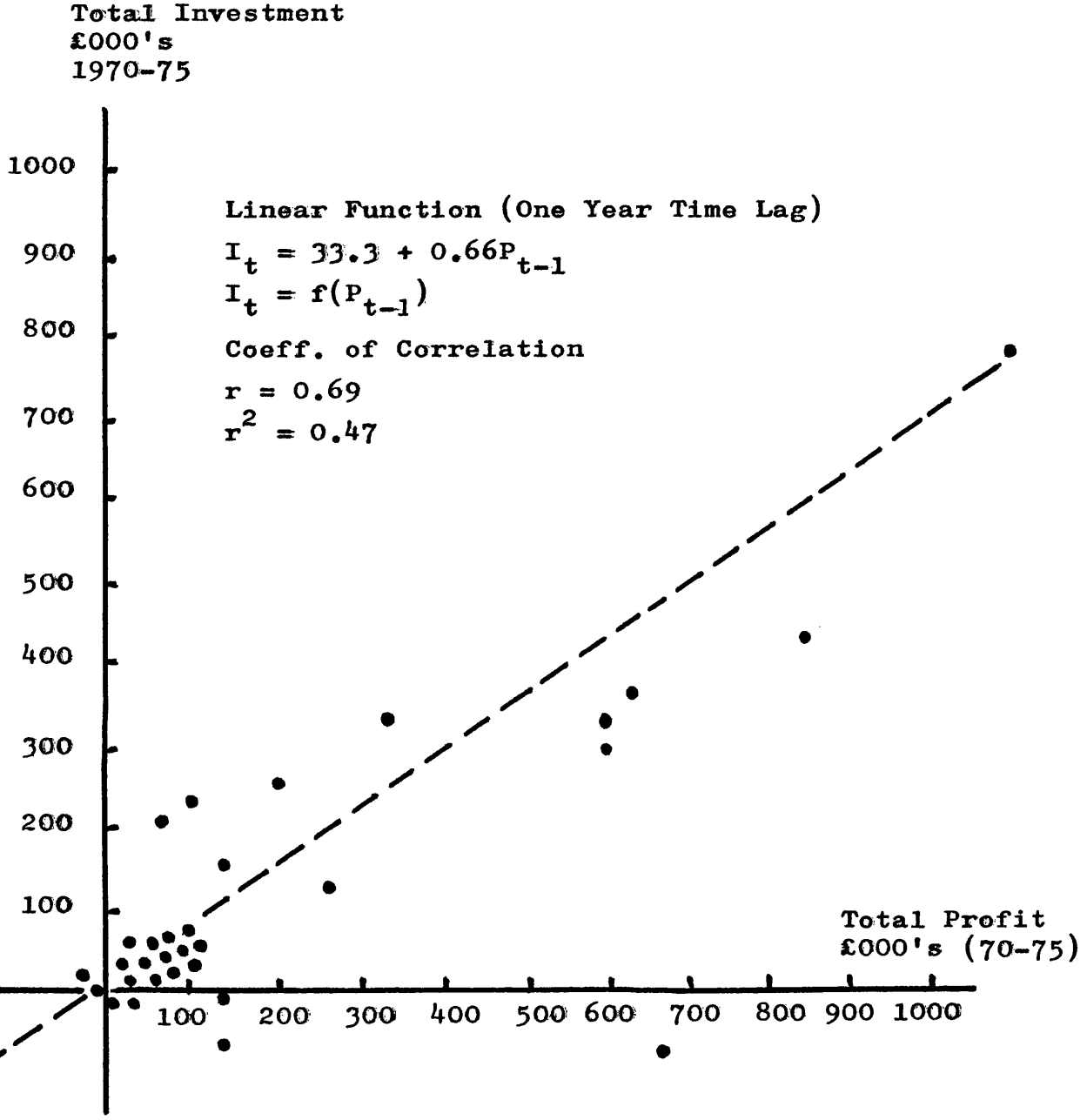
Source: Plymouth Survey Questionnaires; Quests. 21,22, 25. Companies House, Annual Returns, London.

Fig 9.4 Relationship Between Real Investment$_t$ and Real Profit$_{t-1}$. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 21, 22, and 25. Companies House, Annual Returns, London.

Fig 9.5 Correlation Between Investment$_t$ and Profit$_{t-1}$
Plymouth Survey Full Sample



Source: Plymouth Survey Questionnaires;
Questions 21, 22, and 27
Companies House, Annual Returns, London.

Table 9.5 Actual Levels of Investment$_t$ and Profit$_{t-1}$ for 6 Specimen Firms During 1971-75. Plymouth Survey

Code	Lab'r		1975	1974	1973	1972	1971
P1	200+						
		Investment$_t$		£163934	£81968	£60328	£122027
		Profit$_{t-1}$		£278000	£260000	£172800	£148700
P9	0-24						
		Investment$_t$		-£10	£7476	-£1267	£7606
		Profit$_{t-1}$		-£740	£8712	-£12606	-£10404
P15	0-24						
		Investment$_t$	£3084	£4333	£636	£3131	£1791
		Profit$_{t-1}$	£200	£3500	£2900	£2000	£1600
P30	25-99						
		Investment$_t$	£4619	£3288	£754	-£728	
		Profit$_{t-1}$	£30735	£22412	£1004	-£2857	
P54	25-99						
		Investment$_t$	£8000	£6105	£429	£766	£8500
		Profit$_{t-1}$	£12114	£14721	£8278	£2671	£6643
P62	200+						
		Investment$_t$	£207399	£280038	£171703	£101088	
		Profit$_{t-1}$	£451426	£321754	£181228	£228000	

Source: Plymouth Survey Questionnaires; Questions 21 & 22. Companies House, Annual Returns, London.

Fig 9.6 Actual Levels of Investment$_t$ and Profit$_{t-1}$ for 6 Specimen Firms During 1971-75. (Plymouth Survey)

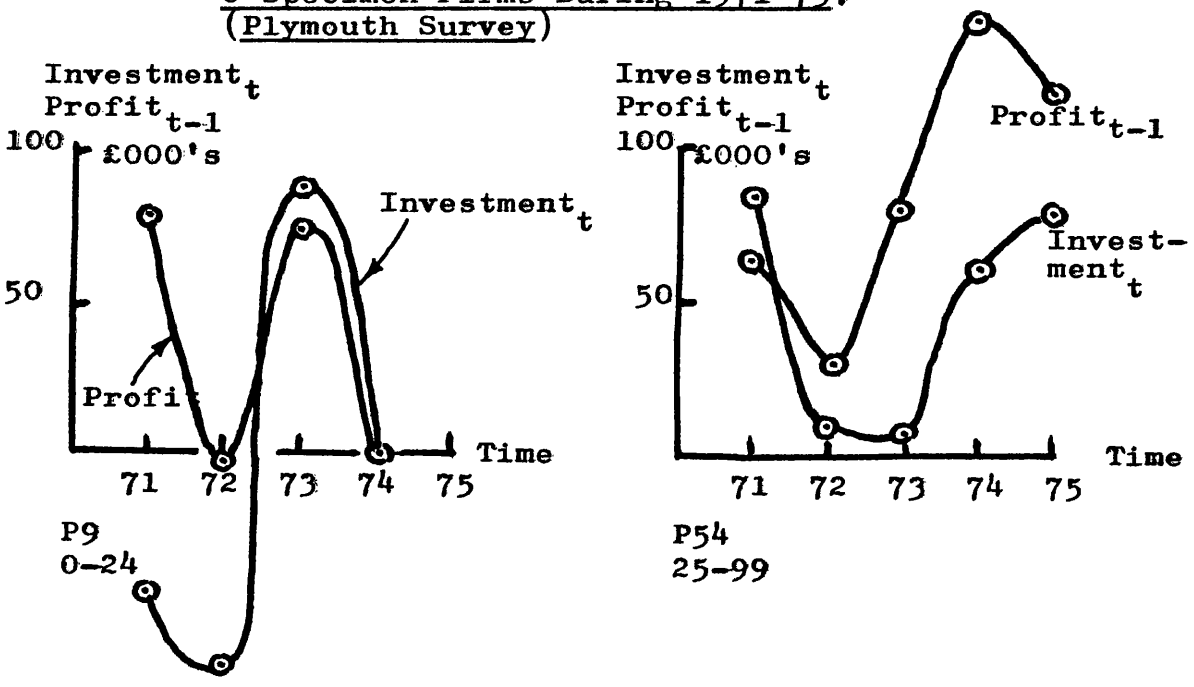
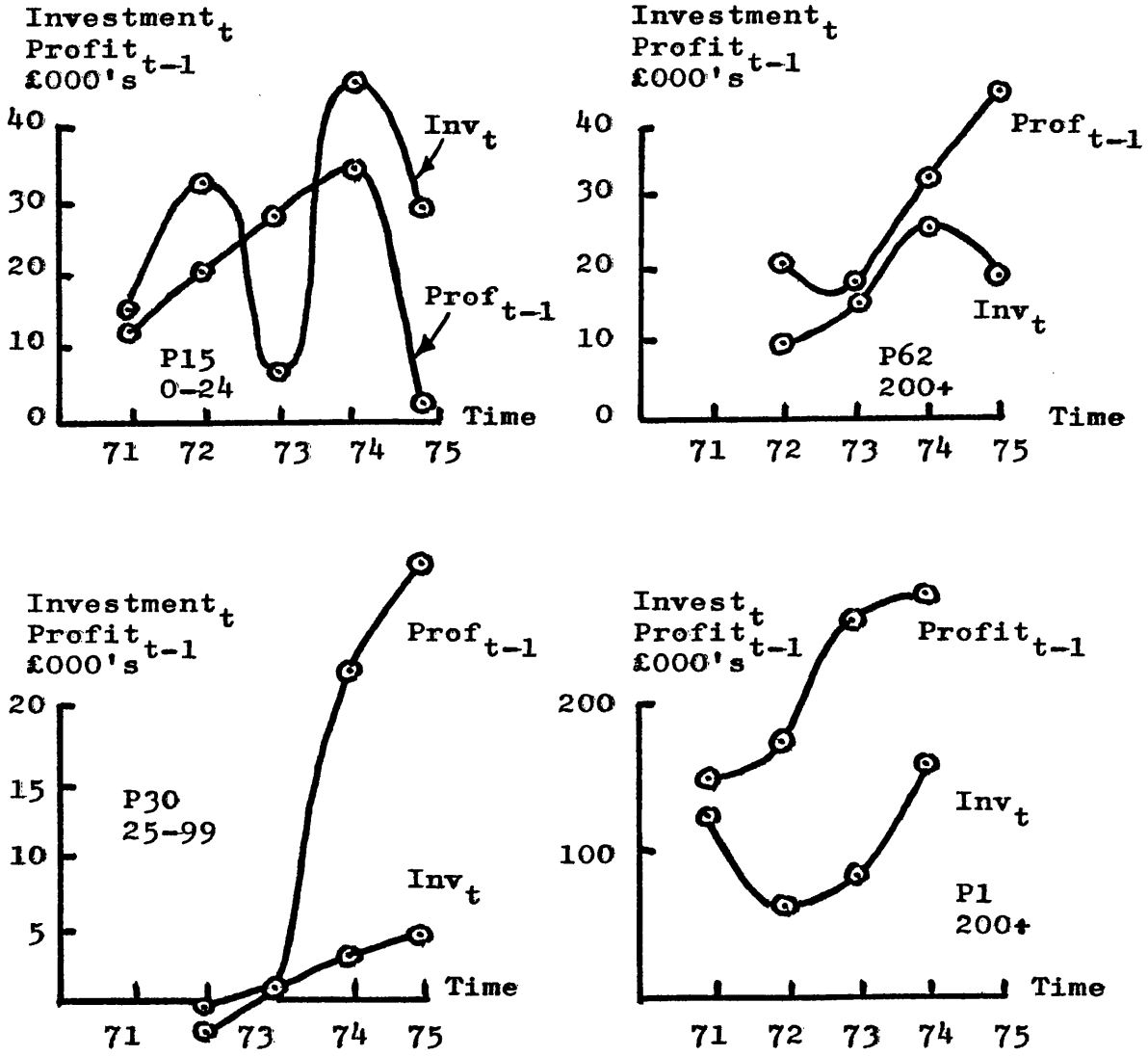


Fig 9.6 (Continued)



Source: Plymouth Survey Questionnaires;
Questions 21 and 22.
Companies House, Annual Returns, London.

COMMENT A marked affiliation between real profit$_{t-1}$ and real investment$_t$ is apparent, and is especially strong within the 0-200 employee group. (The relationship between actual profit and actual investment is, of course, equally evident). The coefficient of correlation between the two

variables for the full 65 firm sample is 0.69 and with $r^2 = 0.47$ this suggests that just half of all investment decisions tend to be motivated primarily by own funds being available, or finance raised on the strength of recent profits. This statistical result coincides strongly with the verbal evidence collated in Chapter 3, pp 100-112, and hints, for example, that any government measure which increases post-tax profit for the smaller firm will, in turn, stimulate investment. At the time of writing, the effects of the reduction of corporation tax from 52% to 42% for concerns with no associated companies and profit under £30,000; and the introduction of a variable rate for firms with profits between £30,000 and £50,000 (Finance Bill 1976, cl. 24) is unknown, but in the light of the above, this could be encouraging.

CAPSULE IV
INVESTMENT INDICATORS

"Firms in the Plymouth Survey were asked to specify which indicators, if any, helped to form general investment expectations for the future.....Some 62% felt that no reliable indicators existed apart from historical data such as output, assets, profits, etc.....Only 3% quoted an inverse link between investment and labour.....The impression was that investment was inspired mainly by necessity or circumstance which rendered capital spending imperative.....Moreover, only 12% of the sample regarded the yield, i.e. the expected return on an investment, as a major investment determinant". (Chapter 3; pp 121-141).

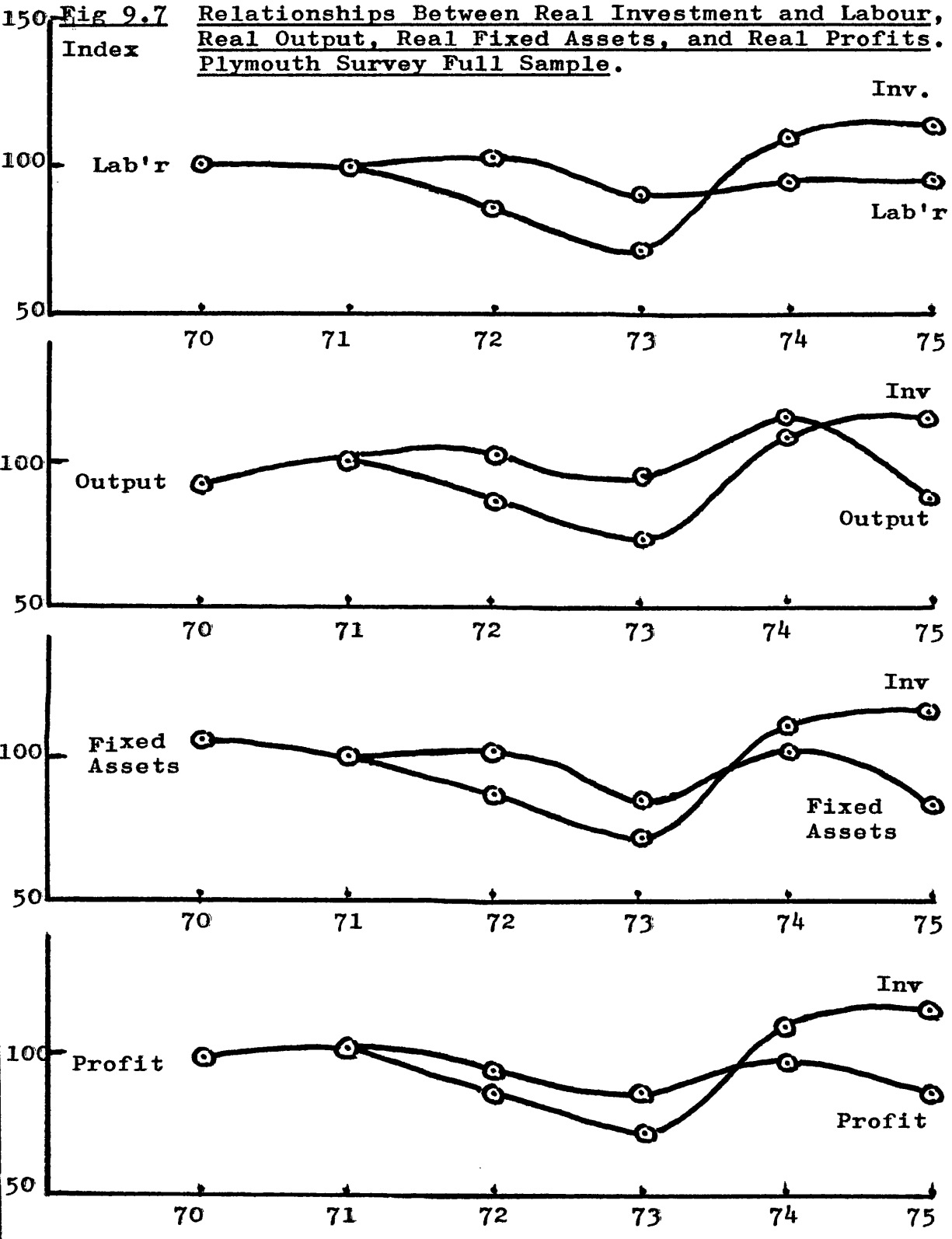
Table 9.6 Average Levels of Real Profit, Real Fixed Assets, Real Output, Labour, Real Investment, and Real Rate of Return on Net Assets. Plymouth Survey Full Sample.

	1975	1974	1973	1972	1971	1970
Real Profit	£45640	£51524	£46036	£50152	£53493	£53360
Index	85	96	86	93	100	99
Labour	122	120	114	127	126	126
Index	96	95	90	101	100	100
Real Fixed Assets.	£159494	£195547	£158038	£193545	£192960	£205333
Index	82	101	82	100	100	106
Real Output.	£750586	£1023452	£840987	£914239	£892969	£825230
Index	84	114	94	102	100	92
Real Investment.	£22527	£21480	£14088	£17337	£19704	
Index	114	109	71	88	100	
Rate of Return on Net Assets	16.83%	17.76%	17.99%	15.59%	16.08%	17.24%
Index	104	110	111	97	100	107
Real Rate of Return on Net Assets.	8.81%	11.55%	13.58%	12.86%	14.20%	17.24%
Index	62	81	95	90	100	121
Inflation i.e. Retail Price Index	190.9	153.7	132.4	121.2	113.2	100.0

Source: Plymouth Survey Questionnaires;
Questions 14, 15, 16, 21, 22, 25, and 26.
Companies House, Annual Return, London.

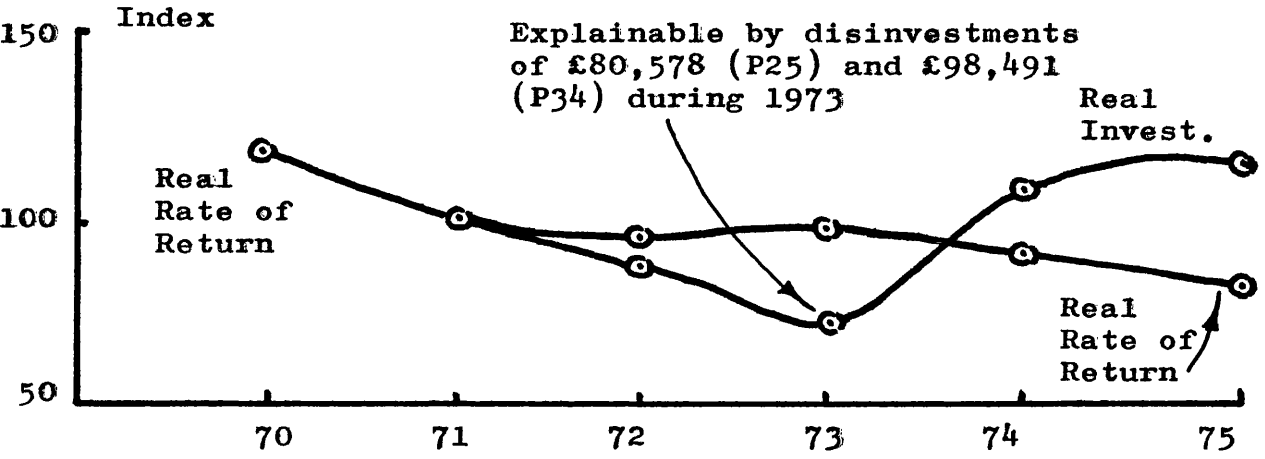
These results are now presented graphically. In Figure 9.8 it should be noted that significant disinvestments by two firms tend to distort the overall investment level for 1973 to some extent.

Fig 9.7 Relationships Between Real Investment and Labour, Real Output, Real Fixed Assets, and Real Profits. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 14, 15, 16, 21, 22, 25. Companies House, Annual Returns.

Fig 9.8 Relationship Between Real Investment and Real Rate of Return on Net Assets. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires;
Questions 21 and 26
Companies House, Annual Returns, London.

COMMENT In general terms it was suggested that sustained long term investment planning was nominal and the contribution which such a policy could make towards investment optimality was equally limited. Historical data seemingly provided the basis for capital expenditure decisions as indicated by the graphical relationships. The finding that only 3% of the sample inverted labour with investment was also confirmed in that the correlation appeared to be positive for the period under review. And the historical real rate of return on net assets and real investment were inclined to be similarly related despite the fact that only 12% of the sample regarded the yield as a major indicator of investment.

CAPSULE V

INVESTMENT FUNDS

"In the Plymouth Survey, the majority of the firms had

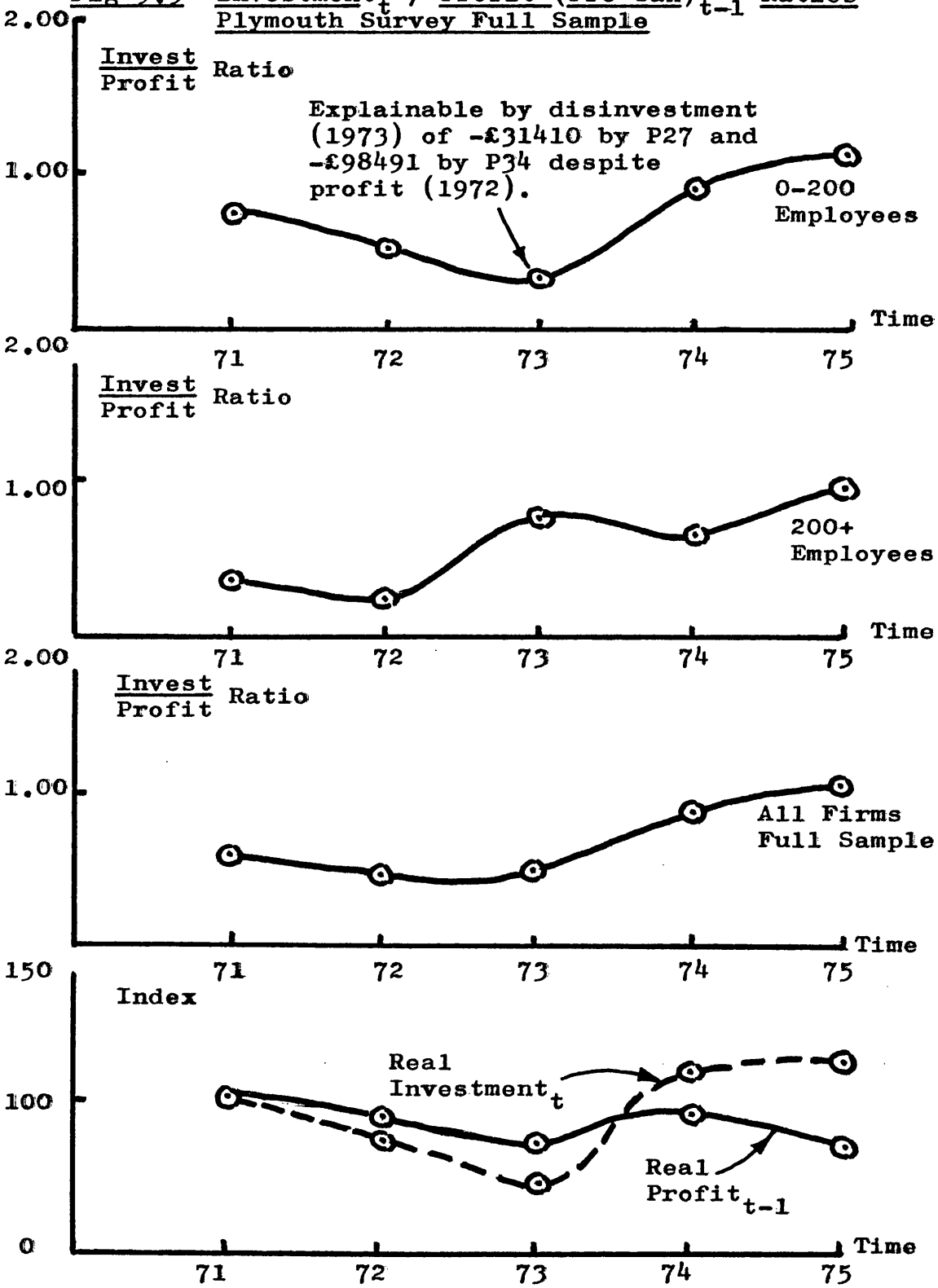
used banking facilities for investment purposes when their own, or private funds, had been inadequate..... It seemed reasonably apparent that a large part of the firms' long term finance for investment had been provided by owners' capital, profits, and private loans, with bank support a rising influence with the size of firm..... Without doubt, firms preferred to use their own funds for investment purposes.....Indeed, some campanies were emphatic about rejecting excessive credit even if potentially profitable.....Moreover, there was no shortage of external finance sources.....But it was very soon in evidence that the Plymouth Survey firms did not, in the main, resort to these funds.....In fact, the impression was that external finance was to be avoided .....An outstanding feature of the evidence was that 95% of the sample had not been concerned in any attempt to obtain finance through facilities beyond the local bank or other subsidiary sources". (Chapter 4; pp 145-168).

Table 9.7 Investment$_t$ / Profit$_{t-1}$ Ratios. Plymouth Survey Full Sample.

Size of Firm	1975	1974	1973	1972	1971	Mean
0-24	0.52	1.07	0.30	0.13	0.78	0.56
25-99	1.10	0.54	-0.34	0.31	0.79	0.48
100-199	1.59	1.10	1.17	1.10	0.38	1.06
200 +	1.10	0.70	0.78	0.30	0.38	0.63
Full Sample	1.05	0.85	0.47	0.46	0.58	0.68
Below 200 only	1.07	0.90	0.37	0.51	0.65	0.70

Source: Plymouth Survey Questionnaires;
Questions 21, 22, 25, and 27.
Companies House, Annual Returns, London.

Fig 9.9 Investment$_t$ / Profit (Pre-Tax)$_{t-1}$ Ratios
Plymouth Survey Full Sample



Source: Plymouth Survey Questionnaires; Q 21, 22, 25, 27.
Companies House, Annual Returns, London.

COMMENT It has already been shown that the correlation between investment$_t$ and profit$_{t-1}$ is significant with $r = 0.69$ and $r^2 = 0.47$ (Capsule III). Thus, this link is basically well established within the Plymouth Survey firms. The ratios, although somewhat inconclusive, possibly due to the smallness of the samples when the four sizes of firm are analysed, nevertheless do hint at a greater reliance on bank credit for the larger units. The ratios for the three sizes of firm below 200 employees are 0-24 employees = 0.56 (post-tax ratio = 1.16); 25-99 employees = 0.48 (post-tax ratio = 0.99); and 100-199 employees = 1.06 (post-tax ratio = 2.20). In post-tax profit terms, assuming corporation tax at 52%, the scaled up ratios imply that the 0-99 employee companies tend to be reluctant to commit themselves to investing beyond the ploughback point, whilst the 100-199 firms appear to be rather less constrained in this respect as per Table 4.1 (Chapter 4; p 147). But it remained true that the majority were very much against external finance, and the overall ratio of 0.68 (post-tax ratio = 1.41) would be explained more in terms of bank facility rather than institutional. Unfortunately, since only three firms had actually employed external finace for investment purposes, no meaningful conclusion could be reached regarding financial performance, except that the rates of return on net assets were near the average (16.29%) for the whole sample, i.e. P25 = 17.4%; P34 = 13.32%; and P41 = 16.16%.

CAPSULE VI
INVESTMENT AND MONETARY POLICY

"The results showed that credit availability had had no,

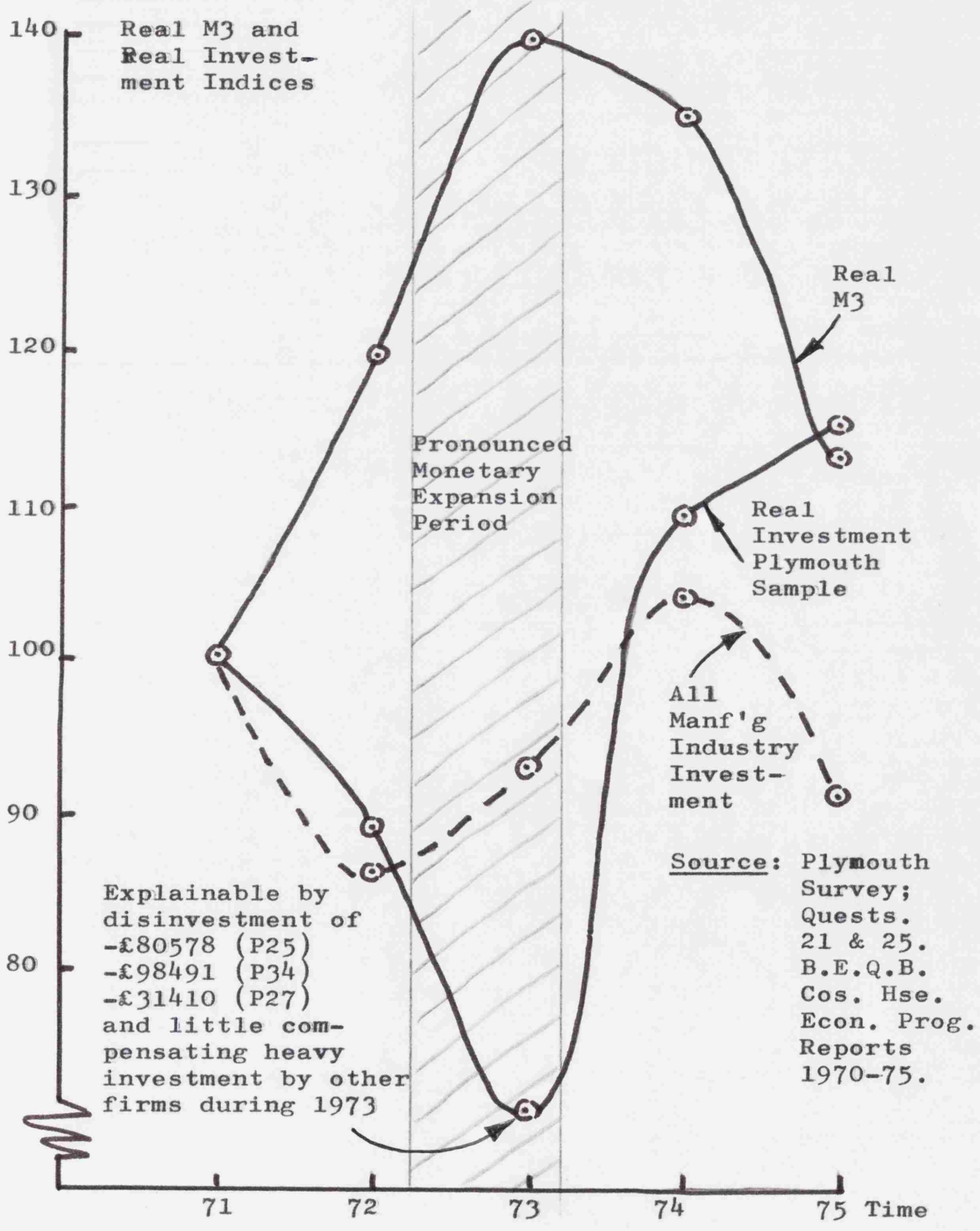
or little, effect on 60% of the sample, and where some influence was discernible in 40% of the population, this had occurred only under special conditions.....If finance were made freely available, this in itself, would be no determinant of investment.....Thus the picture indicated that if governments wished to stimulate investment in industry, then the implementation of monetary policy should be awarded low priority.....Firms had simply invested as required and had not taken advantage of easy credit facilities". (Chapter 4; pp 194-202).

Table 9.8 Real Money Supply (M3); Average Real Investment by Plymouth Survey Firms Full Sample; and Real Investment by all Manufacturing Industry Between 1970-75.

Year	Real Money Supply (M3) £m	M3 Index	Real Invest. by all Manf'g Industry £m	Real Invest. by all Manf'g Industry Index	Plymouth Survey Average Real Invest. £m	Plymouth Survey Average Real Invest. Index
1970	17850	99	2130	106		
1971	17879	100	1991	100	19704	100
1972	21386	119	1738	87	17337	88
1973	25037	140	1864	93	14088	71
1974	24268	135	2087	104	21480	109
1975	20213	113	1820	91	22527	114

Source: Plymouth Survey Questionnaires;
Questions 21 and 25.
Bank of England Quarterly Bulletins 1970-75.
Companies House, Annual Returns, London.
Economic Progress Reports, H.M.S.O., 1970-75.

Fig9.10 Non-Relationship Between Real Money Supply (M3) and Real Investment by all Manufacturing Industry and Average Real Investment by Plymouth Survey Firms Full Sample.



COMMENT Assuming that the real money supply is both a reasonable indicator of monetary expansion, and the growth of funds hopefully intended for capital expenditure, the relationship between M3 and Plymouth Survey investment is negligible. But if a two year time lag is introduced, which is somewhat excessive, the correlation is more pronounced during the expansion period, but doubtful during the M3 contraction. And investment for all manufacturing industry and M3 is only slightly better related. Even so, for example, whilst real M3 increased by 13% between 1971 and 1975, real investment actually fell by 9%. More relevantly, during the period under review, investment by the Plymouth sample firms appears not to have been influenced unduly by government monetary aspirations.

CAPSULE VII
INVESTMENT AND THE MINIMUM LENDING RATE

"The responses indicated that a rising rate of interest was more likely to influence the level of investment than a falling one.....More specifically, a rising minimum lending rate (MLR) would reduce capital expenditure more than a falling one would increase this spending.....But some 33% of the sample felt that the MLR had little, or no, impact on investment decisions at all.....A further 17% considered that the relationship between the MLR and investment was indeterminate .....Certainly, the investment behaviour of the Plymouth firms with regard to the MLR appeared to be somewhat involved and unpredictable.....However, we

may strongly infer that monetary policy involving nominal changes in the MLR to influence investment has not enjoyed, and is unlikely to enjoy notable measures of success". (Chapter 4; pp 207-216).

Table 9.9 Average Real Investment - Plymouth Survey Full Sample, and the Minimum Lending Rate During 1971-75.

Year	Average Real Investment	Average Real Investment	Minimum Lending Rate	Minimum Lending Rate Index
1971	20098	102	6%	100
	19704	100	5%	83
1972	18915	96	5½%	91
	17337	88	9%	150
1973	14975	76	7½%	125
	14088	71	13%	216
1974	18127	92	12%	200
	21480	109	11½%	191
1975	22265	113	10%	166
	22527	114	11½%	191

Source: Plymouth Survey Questionnaires;
Questions 21 and 25.
Bank of England Quarterly Bulletins; 1971-75.
Economic Progress Reports, H.M.S.O., 1971-75.
Companies House, Annual Returns, London.

Fig 9.11 Relationship Between the MLR and Average Real Investment of Plymouth Survey Full Sample During 1971-75.

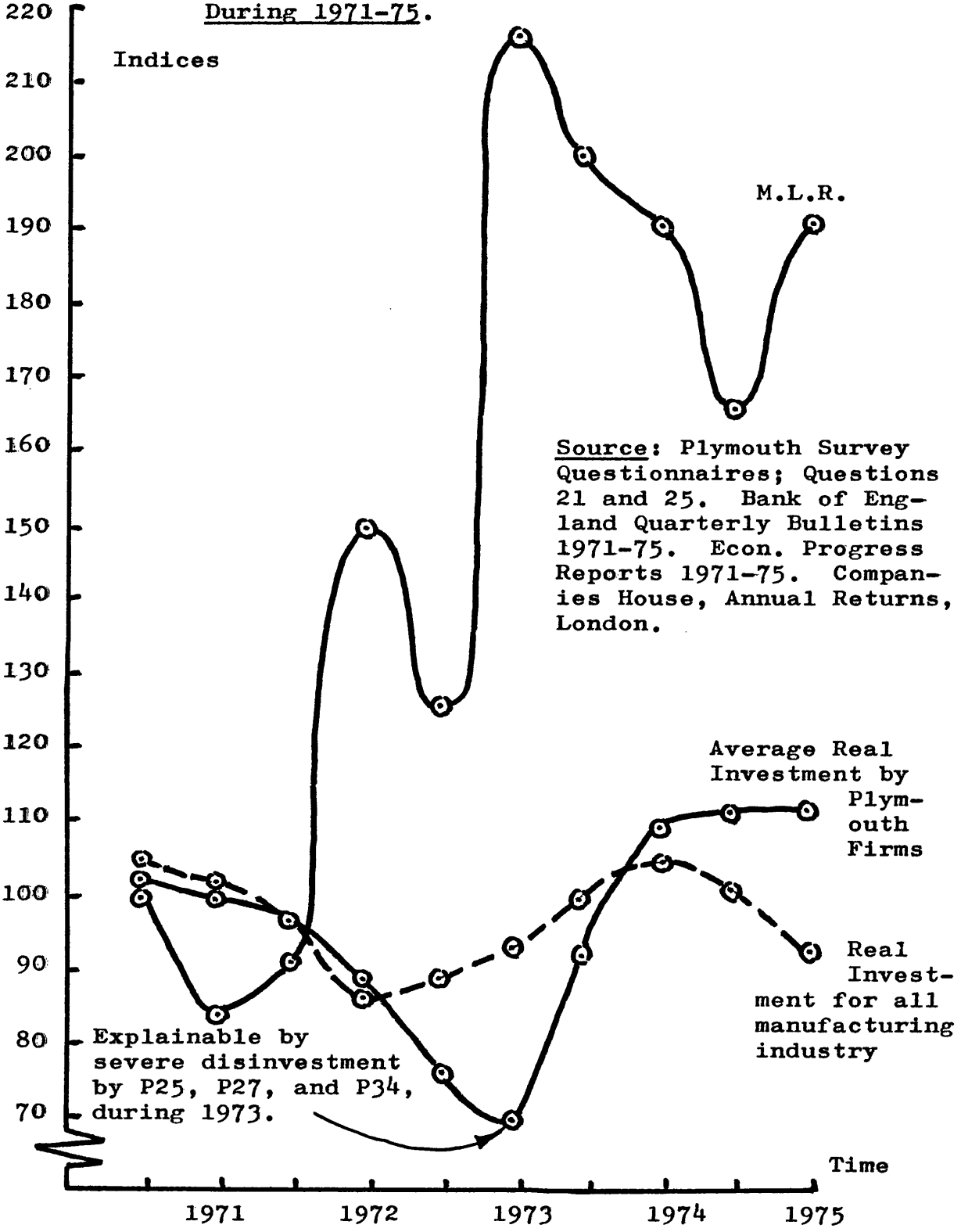
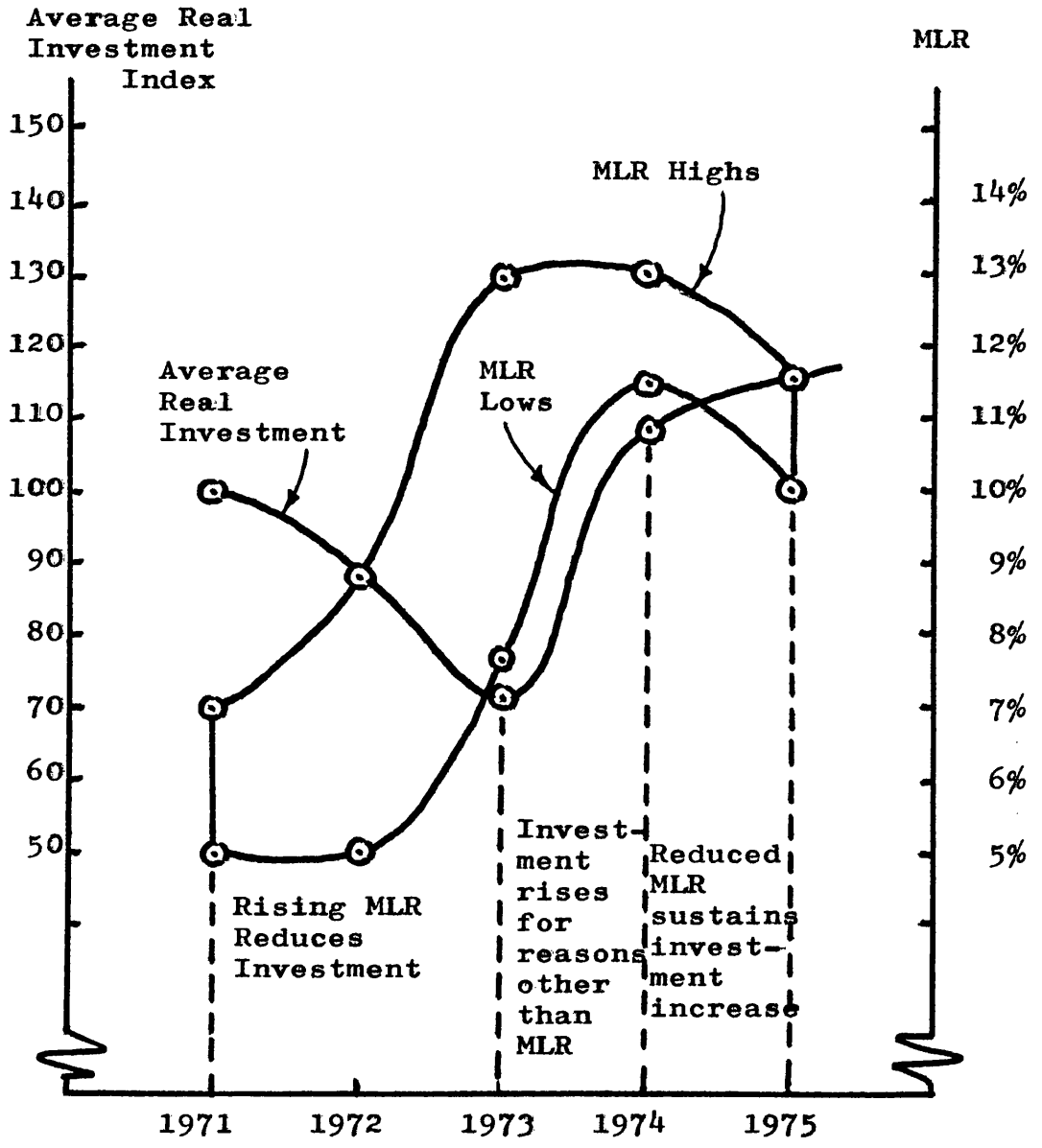


Fig 9.12 Relationship Between the MLR Highs and Lows, and Average Real Investment. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires;
Questions 21 and 25.
Bank of England Quarterly Bulletins 1971-75.
Companies House, Annual Returns, London.

COMMENT The MLR trend fell on three occasions between 1971 and 1975. In 1971 it fell from 6% to 5% but the average real investment of the Plymouth firms actually decreased from £20098 to £19704. During 1972-73 the MLR declined from 9% to 7½% during the period of pronounced monetary expansion but, again, average real investment fell from £17337 to £14975. On the third occasion during 1974-75 when the minimum lending rate trend decreased from 12% to 10%, average investment did respond with a 22% increase from £18127 to £22265. On the other hand, when the MLR trend has risen the response of investment has been equally unpredictable. For example, when considering the whole period 1971-75 the MLR index rose from 100 to 191, but the average real investment index also increased from 102 to 114. However, between 1971 and 1973 when the MLR rose from 6% to 13%, average real investment fell severely from £20098 to £14088. Incidentally, the relationship between the MLR and real investment for all manufacturing industry is similarly obscure. The results then are clearly inconclusive except that the effects of monetary policy aimed at the control of investment by the MLR are unlikely to be reliable.

CAPSULE VIII
INVESTMENT RETURNS AND REGIONAL AID

"Only 9% of the sample (6 firms), the very small ones least of all, could claim that investment incentives of all kinds had had a significant influence on their capital expenditure decisions.....Although 31% of the firms said that their investment plans could be encouraged by regional aid, they nevertheless regarded this influence as marginal.....The investment decisions of 60% of the sample with the smaller units again predominating, had

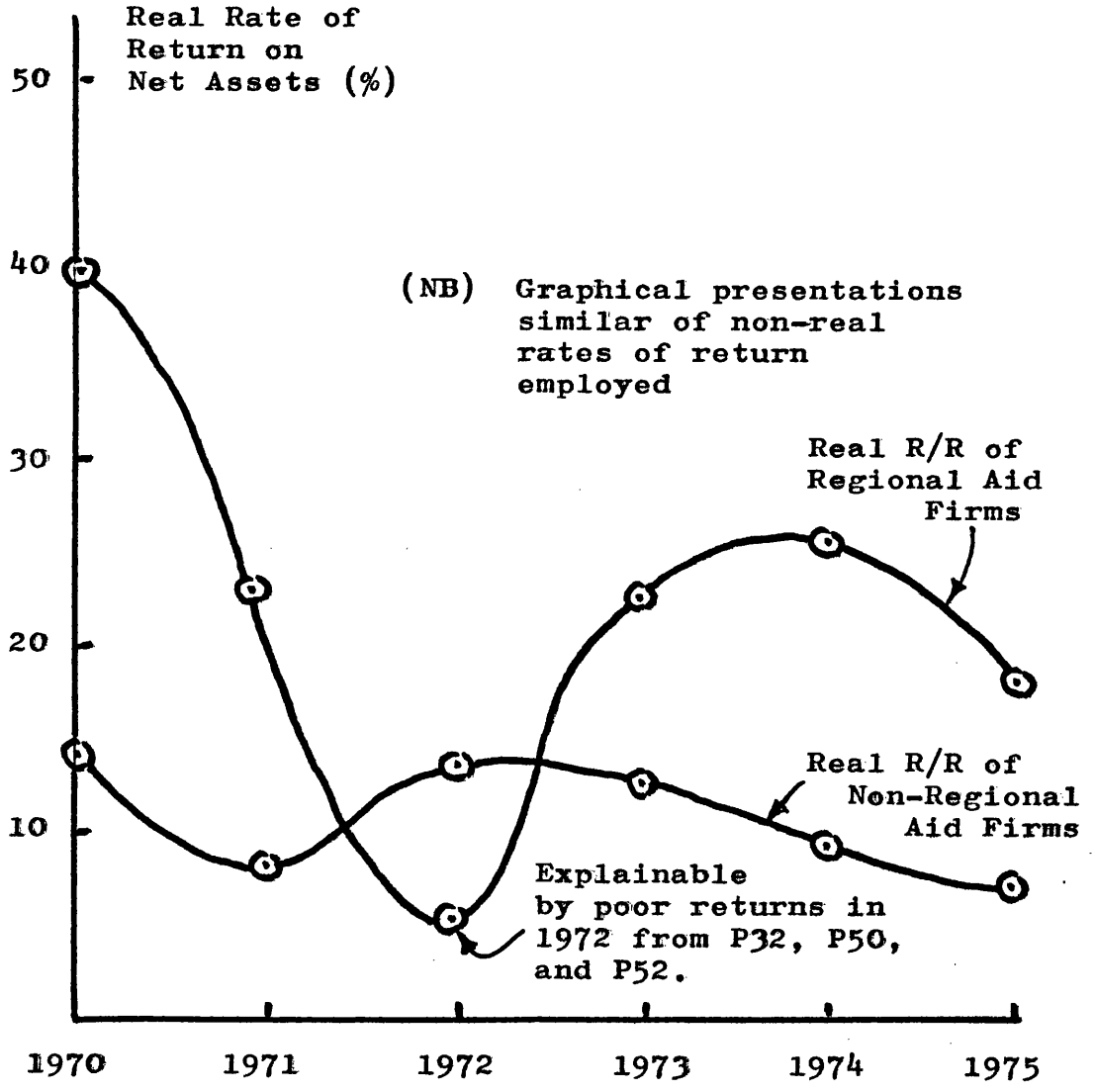
clearly not been influenced in any way by government incentives.....The majority of the Plymouth Survey firms were obviously only intetested in regional aid when it actually coincided with their own plans for investment.. .....If firms were investment optimising, then presumably they would be aid optimising also, but this was apparently not the case.....As a consequence, it was hardly likely that the companies under review were optimising their investment returns as far as regional aid was concerned". (Chapter 4; pp 222-231).

Table 9.10 % Returns on Net Assets of Regional Aid and Non-Regional Aid Firms Between 1970 and 1975. Plymouth Survey Full Sample.

	1975	1974	1973	1972	1971	1970	Mean
Regional Aid Firms (9%)	34.78	38.61	29.76	7.38	26.97	40.45	29.65
Real R/R of R.A. Firms	18.20	25.07	22.54	6.09	23.86	40.45	22.70
Non-Reg. Aid Firms (31%)	13.84	15.23	16.36	16.67	10.63	14.17	14.48
Real R/R of Non R.A. Firms	7.24	9.88	12.39	13.77	9.40	14.17	11.14
All Firms Full Sample	16.83	17.76	17.99	15.59	16.08	17.24	16.29
Real R/R All Firms	8.81	11.55	13.58	12.86	14.20	17.24	12.52
Inflation Index	190.9	153.7	132.4	121.2	113.2	100.0	

Source: Plymouth Survey Questionnaires;
Questions 20, 22, 26 and 54.
Companies House, Annual Returns, London.

Fig 9.13 Real Rate of Return on Net Assets of Regional Aid and Non-Regional Aid Firms Between 1970 and 1975. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 20, 22, 26 and 54.
Companies House, Annual Returns, London.

COMMENT The graphs present a somewhat dramatic distinction between the rate of return for regional aid and non-regional aid firms. The mean for the former being 29.65% (22.70% real) and 14.48% (11.14% real) for the latter. However, two points should be borne in mind. Firstly, a sample of 6 comprising the regional aid firms is far too small to be effective. And secondly, two of these firms (P20 and P24) produced exceptional returns over the period. For example, P20 returned 73.38% (47.64% real) in 1974 and 73.00% (55.30% real) in 1973, whilst P24 produced 85.33% (85.33% real) for 1970. These results tended to distort the figures unduly. Nevertheless, the thesis implied in Chapter 4 (pp 222-231) is borne out to the extent that the regional aid firms did produce better returns than firms who had not taken advantage of the facilities available.

CAPSULE IX
INVESTMENT APPRAISAL AND THE RATE OF RETURN ON NET ASSETS

"The tables indicate that the payback and rate of return methods were by far the most popular used.....The consolidated schedule of the main methods used by the Plymouth Survey firms confirmed that 68% employed the traditional techniques; 17% employed N.P.V. or I.R.R; and 15% used trial and error methods or none at all.....In the Plymouth Survey, the firms' attitudes tended to fall into two camps; firms predominantly using the traditional methods believed that the quality of the investment decision was not influenced by the quality of the investment appraisal method, whilst firms employing modern techniques conceded, with reservations, that the quality of the method could enhance the quality of the decision.....

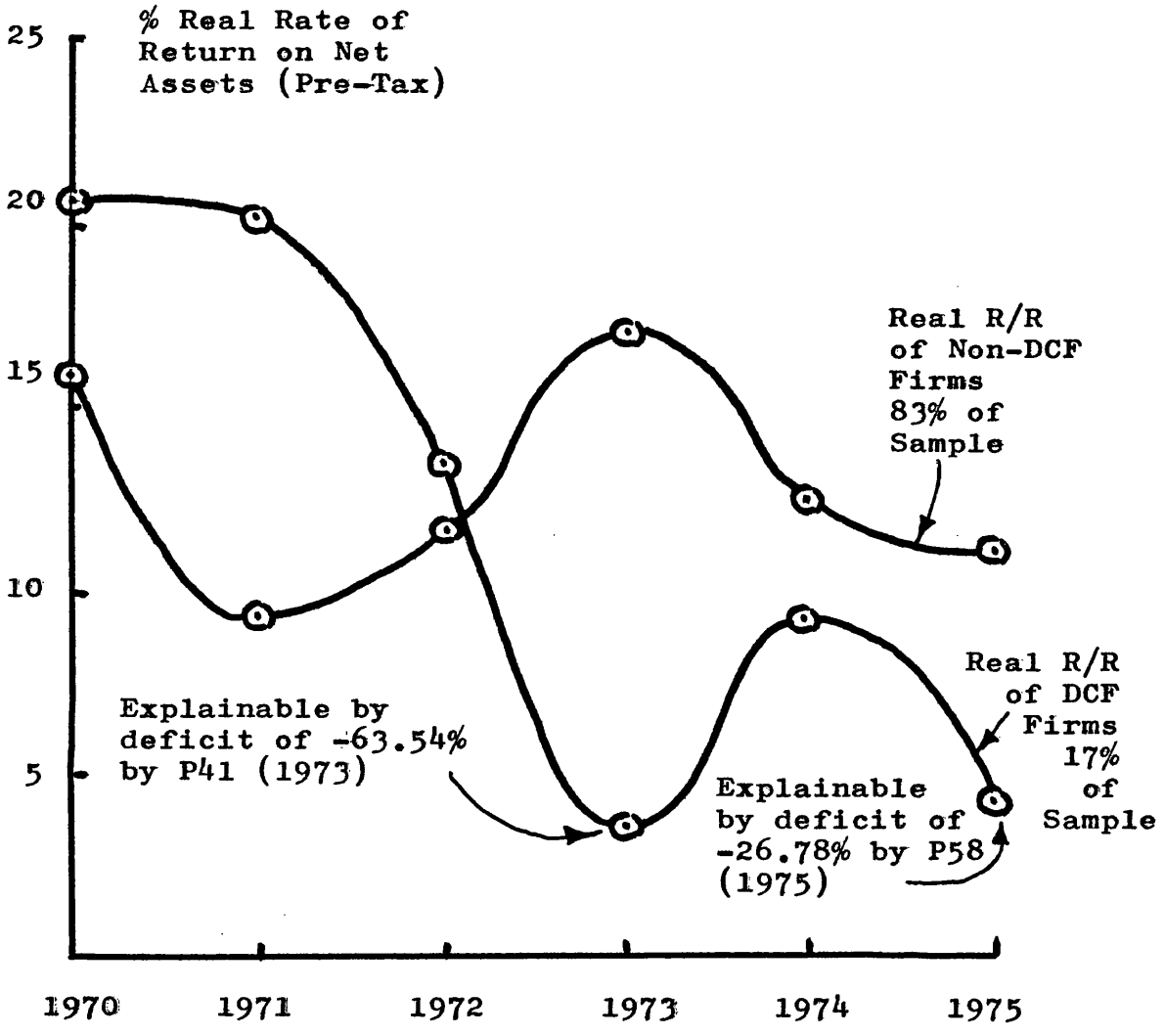
It is possible that firms could be sub-optimising their investments and returns as a consequence of their inability or even refusal to employ more mathematical techniques". (Chapter 5; pp 252-265).

Table 9.11 Average Percentage Real Rates of Return on Net Assets by D.C.F. Firms and Non-D.C.F. Firms Between 1970-1975. Plymouth Survey Full Sample.

	1975	1974	1973	1972	1971	1970	Mean
DCF Firms (17% of Total 65)	7.77	13.67	5.00	15.88	22.81	20.62	14.25
Real R/R of D.C.F. Firms	4.07	8.89	3.77	13.10	20.15	20.62	11.76
Non-DCF Firms (83% of Total 65)	21.86	19.27	21.65	15.52	10.17	16.64	16.76
Real R/R of Non-DCF Firms	11.45	12.53	16.35	12.80	8.98	16.64	13.12
All Firms Full Sample	16.83	17.76	17.99	15.59	16.08	17.24	16.29
Real R/R All Firms Full Sample	8.81	11.55	13.58	12.86	14.20	17.24	12.52
Inflation Index	190.9	153.7	132.4	121.2	113.2	100.0	

Source: Plymouth Survey Questionnaires;
Questions 20, 22, 26, 62 and 63.
Companies House, Annual Returns, London.

Fig 9.14 Average Real Rates of Return on Net Assets by D.C.F. Firms and Non-D.C.F. Firms Between 1970-1975. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires;
Questions 20, 22, 26, 62 and 63.
Companies House, Annual Returns, London.

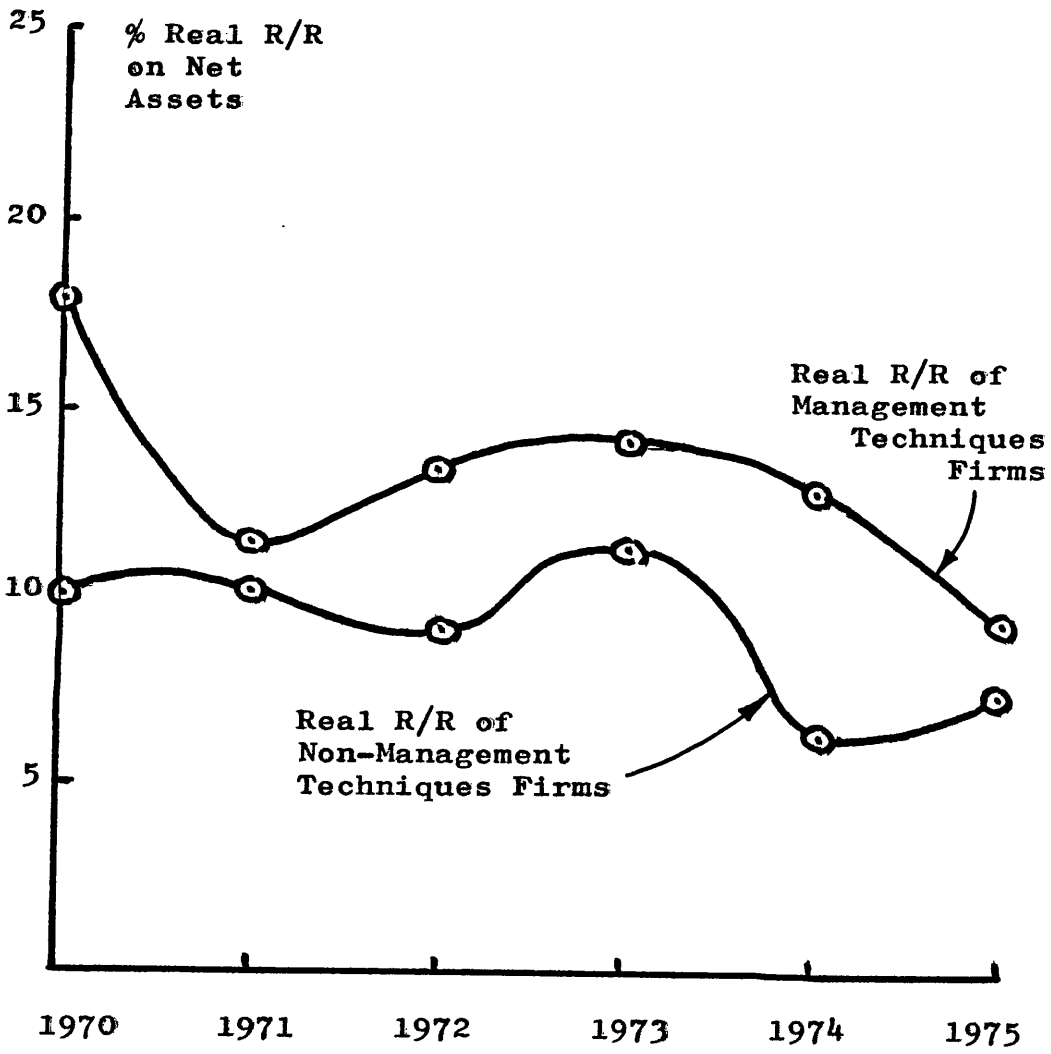
COMMENT The findings probably suggest, above all, that further research would be advisable in order that the small sample of pro-DCF firms might be increased and the period under review extended. Even so, it is perceptible that between 1970 and 1972 the rates of return on net assets of the firms employing DCF exceeded those of the non-DCF companies. However, from 1972 the overall performances of the traditionalist firms were superior. It could be the case, of course, that the accelerating inflation from 1972 onwards might have affected the anticipated longer term discounted cash flows more adversely than shorter term payback calculations. On balance, considering the verbal, documentary, and financial evidence it is almost certain that levels of investment and rates of return, even if acceptable, were inconsistent with the goal of optimality, fundamentally as a result of most firms being unfamiliar with the real techniques of investment appraisal.

CAPSULE X
INVESTMENT RETURNS AND THE USE OF MANAGEMENT TECHNIQUES

"Respondents were asked to indicate the most important management techniques employed including investment appraisal.....It was striking that investment appraisal was not accorded priority by any of the firms.....And 12% of the sample could not indicate any major techniques at all.....Some correlation between a British Institute of Management Survey and these Plymouth findings could not be ruled out.....In the majority of cases it appeared that the method of investment appraisal used by the firms was not so much selected, as 'emerged'..... The evidence suggested, again, that firms were not aiming

for, or achieving, the optimum returns attainable via investment appraisal and other management techniques". (Chapter 5; pp 284-300).

Fig 9.15 Average % Real Rates of Return on Net Assets of Management Techniques Firms and Non-Management Techniques Firms Between 1970 and 1975. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 20, 22, 26 and 70. Companies House, Annual Returns, London.

Table 9.12 Average % Rates of Return on Net Assets of Management Techniques Firms and Non-Management Techniques Firms Between 1970-1975. Plymouth Survey Full Sample.

	1975	1974	1973	1972	1971	1970	Mean
Non-Mangt Techniques Firms (12% of 65)	14.14	9.28	15.48	10.62	11.43	10.14	11.71
Real R/R of Non-Mangt Techs Firms	7.40	6.03	11.69	8.76	10.09	10.14	9.01
Firms Using some Mangt. Techs (88% of 65)	17.56	19.08	18.43	16.40	12.77	18.45	16.99
Real R/R of Mangt. Techs Firms	9.19	12.41	13.91	13.53	11.28	18.45	13.12
All Firms Full Sample	16.83	17.76	17.99	15.59	16.08	17.24	16.29
Real R/R of Full Sample	8.81	11.55	13.58	12.86	14.20	17.24	12.52
Inflation Index	190.9	153.7	132.4	121.2	113.2	100.0	

Source: Plymouth Survey Questionnaires;
Questions 20, 22, 26 and 70.
Companies House, Annual Returns, London.

COMMENT Two main problems were apparent. On the one hand it was not easy to categorise specifically the firms who were employing some management techniques, and those who were clearly using none at all. Every firm could show to varying degrees that certain systems were in operation, but eight of the smaller units did not appear to be well advanced even in basic systems, and said so. Admittedly, in certain instances the introduction of sophisticated operations research techniques would be fairly dif-

ficult, if not impossible. Nevertheless, the mean rate of return on net assets for the non-management techniques firms of 11.71% (9.01% real) was well below the 16.99% (13.12% real) for the remaining population. Unfortunately, the second problem is whether a sample of only eight non-management techniques firms is sufficient to give meaning to these figures. Incidentally, two of these firms (P22 and P33) had failed to provide Companies House with up-to-date returns. In the end, it is perhaps permissible to ask the reader to draw his own conclusions.

CAPSULE XI
INVESTMENT AND OUTPUT PER UNIT OF LABOUR

"The Bolton Committee did find that because small firms, on average, used much more labour intensive methods of production than large firms, their share in total capital expenditure was smaller than their share in total output or employment.....The Committee estimated from their questionnaire survey that the annual capital expenditure on fixed assets among small firms in manufacturing had averaged only £83 per person employed in the five year period 1964 to 1968.....That compared with a figure of £189 for all firms over the same period.....Moreover, it is sometimes suggested that small firms are less efficient simply because net output produced per employee (as recorded in successive Censuses of Production) has been substantially lower in small firms than in large..... For example, the 1963 Census of Production showed that net output per person employed in small manufacturing enterprises was some 23% below that in large firms (£1097 per person in enterprises employing under 200 persons against £1425 in larger units).....Additionally, net output per

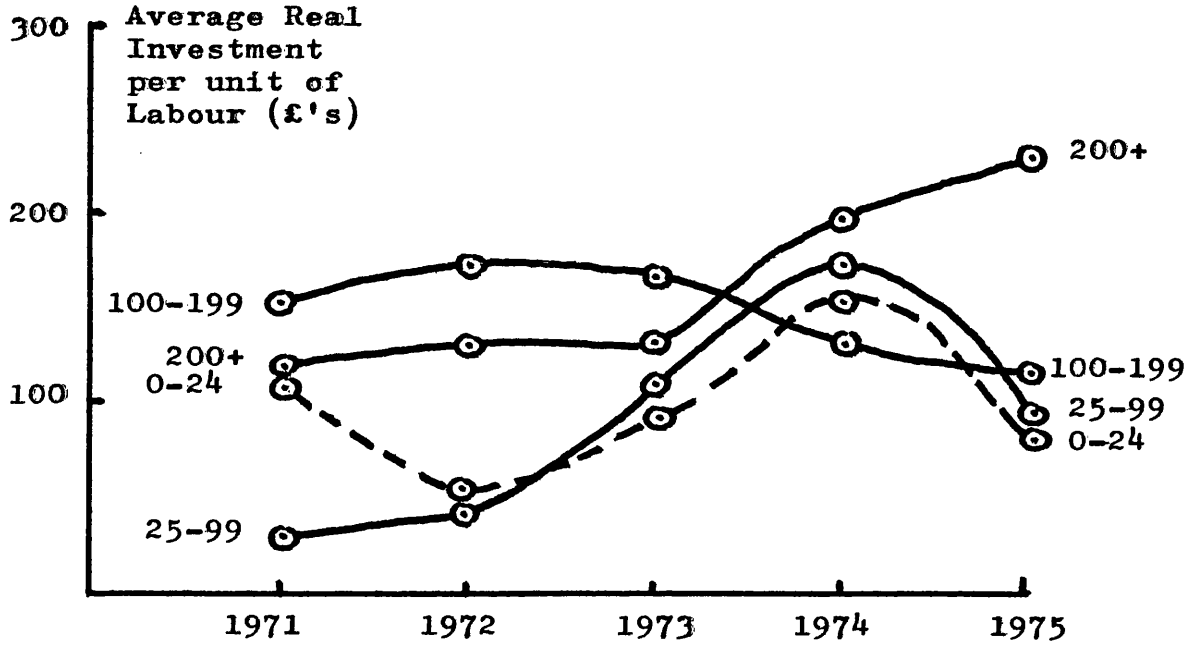
person rose with the size of firm even among small firms themselves". (Chapter 6; pp 336-337).

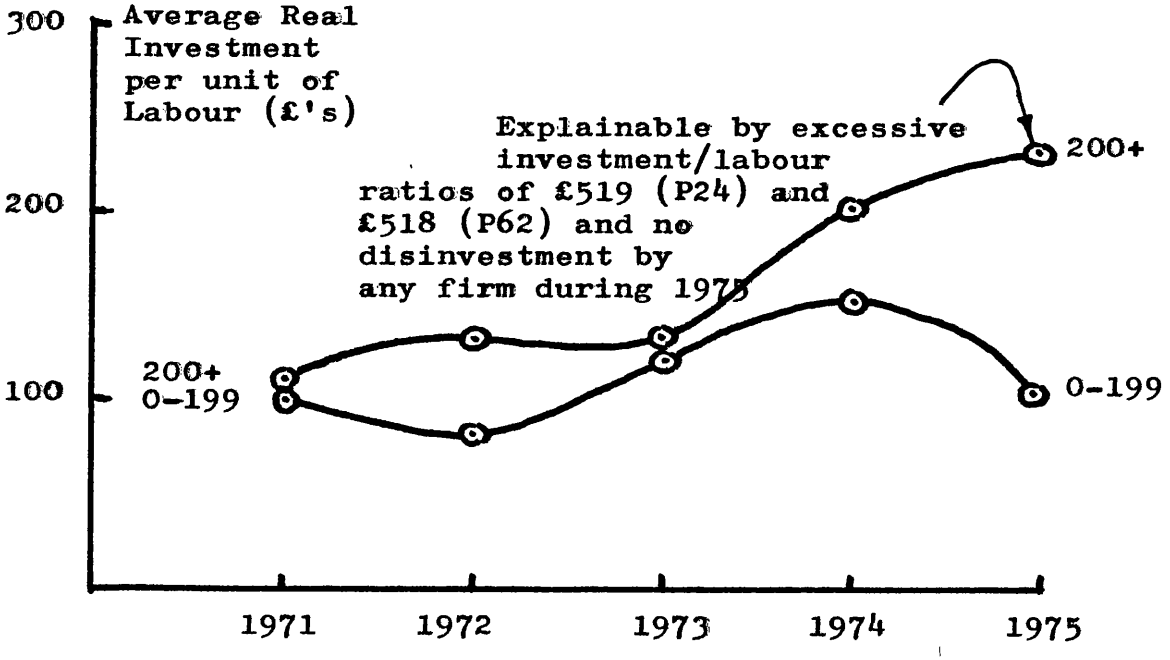
Table 9.13 Average Investment Per Unit of Labour by Size of Firm Between 1971-1975. Plymouth Survey Full Sample (£'s).

	1975	1974	1973	1972	1971	Mean
0-24 Employees	178	242	116	66	122	144
0-24 emp. real invest	93	157	87	54	107	99
25-99 Employees	181	270	140	48	26	133
25-99 emp. real invest	94	175	105	40	23	87
100-199 Employees	210	198	218	204	168	199
100-199 emp real invest	110	128	164	168	148	143
200 + Employees	443	304	172	157	126	240
200 + emp real invest	232	197	130	129	111	159
0-199 Employees	191	230	150	98	115	156
0-199 emp real invest	100	149	113	80	101	108
All Firms Full Sample	249	248	155	109	117	175
All Firms real invest	130	161	117	90	103	120

Source: Plymouth Survey Questionnaires;
Questions 14, 21, 25 and 35.
Companies House, Annual Returns, London.

Fig 9.16 Average Real Investment per Unit of Labour by Size of Firm Between 1971-75. Plymouth Survey Full Sample.





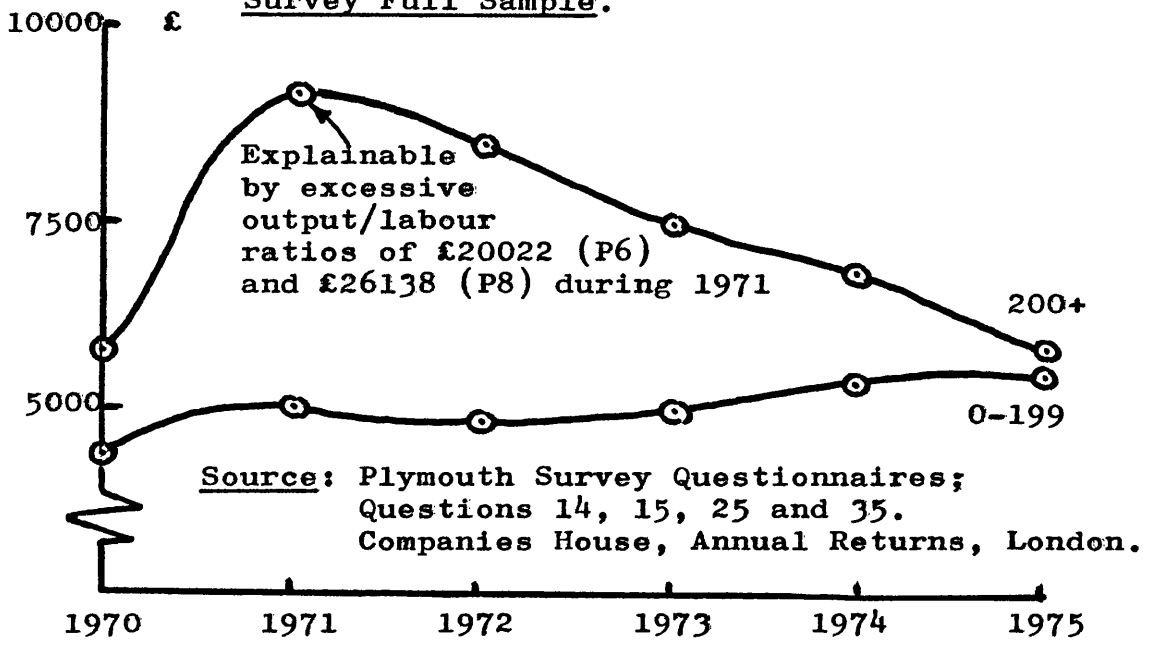
Source: Plymouth Survey Questionnaires; Questions 14, 21, 25 and 35.
Companies House, Annual Returns, London.

Table 9.14 Average Output (£'s) per Unit of Labour by Size of Firm Between 1970-75. Plymouth Survey Full Sample.

Output = Y	1975	1974	1973	1972	1971	1970	Mean
0-24 Actual Y	8381	6998	5283	4591	3880	3660	5226
0-24 Real Y	4387	4544	4002	3794	3433	3660	3970
25-99 Actual Y	10426	7921	7065	7501	7390	3812	6880
25-99 Real Y	5458	5143	5352	6199	6539	3812	5417
100-199 Actual Y	13398	11051	8560	6643	6518	6122	8320
100-199 Real Y	7014	7175	6484	5490	5768	6122	6342
200+ Actual Y	11001	10695	10003	10388	10395	5862	9967
200+ Real Y	5759	6944	7578	8585	9199	5862	7321
0-199 Actual Y	10625	8447	6678	5879	5692	4442	6581
0-199 Real Y	5563	5485	5059	4859	5037	4442	5074
All Firms Actual Y	10695	8933	7296	6823	6632	4625	7226
All Firms Real Y	5599	5800	5527	5639	5869	4625	5509
Inflation Index	190.9	153.7	132.4	121.2	113.2	100.0	

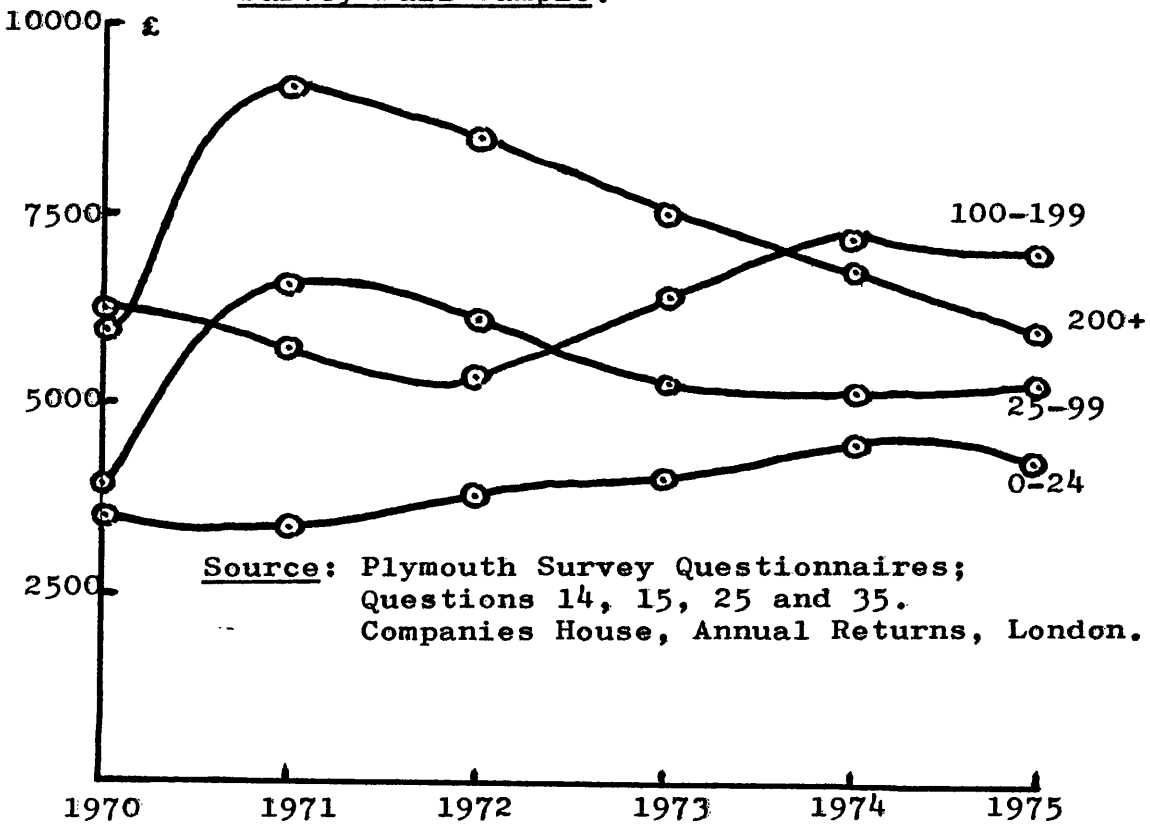
Source: Plymouth Survey Questionnaires;
Questions 14, 15, 25 and 35.
Companies House, Annual Returns, London.

Fig 9.17 Average Real Output (£'s) per Unit of Labour by Size of Firm Between 1970-75. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 14, 15, 25 and 35. Companies House, Annual Returns, London.

Fig 9.18 Average Real Output (£'s) per Unit of Labour by Size of Firm Between 1970-75. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 14, 15, 25 and 35. Companies House, Annual Returns, London.

COMMENT The findings of the Bolton Committee with regard to investment and output per unit of labour in small firms were largely confirmed by the Plymouth Survey. The average real investment/labour ratios did tend to increase with the size of firm, e.g. ratio for 0-24 employees = £99; 25-99 = £87; 100-199 = £143; and for 200+ = £159. And the average real output/labour ratios behaved similarly, e.g. ratio for 0-24 employees = £3970; 25-99 = £5417; 100-199 = £6342; and for 200+ = £7321. It is also observable from the figures that for the 0-199 employee firms only, the average real investment/labour ratios and the average real output/labour ratios are positively related, and especially if a one year time-lag is introduced. In this respect the labour intensive attitudes of the smaller units appear to have contributed to sub-optimum outputs per unit of labour.

CAPSULE XII
TARGET AND ACTUAL RETURNS ON NET ASSETS

"The concept of rigid targeting exemplifies a behavioural pattern closely approximating to satisficing rather than maximising.....A main point to emerge was that despite the appearance of flexibility the target rates of return on net assets, once set, tended to prevail in the majority of cases.....Thus, one is bound to infer that in the main, targeting was somewhat rigid for individual firms, producing satisficing returns on investment at best.....Indeed, when actual rates of return are consulted there is generally an even poorer performance.....Whilst several firms had exceeded their expectations, many had not reached their targets, others had failed to achieve the minimum, and some had sustained losses in the period

selected as per 38 firm sample". (Chapter 6; pp 340-352). "An examination of individual performances revealed that 61% of the 38 firm sample actually failed to reach the target set.....And further analysis suggested that the most successful units from a target achievement point of view were the specialist (and "C") firms producing OMG with between 0-24 and 100-199 employees.....On the other hand, the least successful were the firms with between 25-99 staff involved in long production runs in the FDT and EE industries". (Chapter 6; pp 370-372).

Table 9.15 Comparison of Expected, Minimum, and Actual Non-Real Returns. Plymouth Survey - 38 and Full Sample.

Rate of Return	Expected	Minimum	Actual (38)	Actual (Full)
Less than 0%			5 (13%)	32 (15%)
0% - 10%		29 (45%)	7 (19%)	44 (20%)
10% - 14%	5 (8%)	24 (37%)	4 (11%)	28 (13%)
15% - 19%	9 (14%)	1 (1%)	4 (11%)	25 (11%)
20% - 24%	29 (45%)	5 (8%)	6 (16%)	26 (12%)
25% and over	14 (22%)	6 (9%)	12 (31%)	64 (29%)
No Targets Set	8 (12%)			

Source: Plymouth Survey Questionnaires;
Questions 71, 73, 72, and 27.
Companies House, Annual Returns, London.
(38 Sample = 1972-74; Full Sample = 1970-75)

The totals of columns 2 and 3 relate to the 65 firm sample, and the total of column 4 refers to the 38 firm population. But the sum of column 5, i.e. 219 represents the total number of yearly observations from the full sample over the period 1970-75.

Table 9.16 Discrepancies Between Target and Actual Returns (Non-Real) on Net Assets by Size of Firm Between 1970-75. Plymouth Survey Full Sample.

Rate of Return %	Size of Firm 0-24 Targ	0-24 Act	25-99 Targ	25-99 Act	100-199 Targ	100-199 Act	200+ Targ	200+ Act	Mean Actual R/R
Below 0%		18%		21%		16%			15%
0 - 10%		21%		24%		20%		14%	20%
10 - 14%	12%	13%	8%	12%	9%	11%		16%	13%
15 - 19%	6%	5%	8%	14%	18%	7%	11%	25%	11%
20 - 24%	75%	15%	59%	9%	36%	5%	22%	16%	12%
25% plus	6%	27%	25%	19%	36%	40%	67%	28%	29%

Source: Plymouth Survey Questionnaires;
Questions 71 and 27.
Companies House, Annual Returns, London.

Fig 9.19 Discrepancies Between Target and Actual Returns (Non-Real) on Net Assets by Size of Firm Between 1970-75. Plymouth Survey Full Sample.

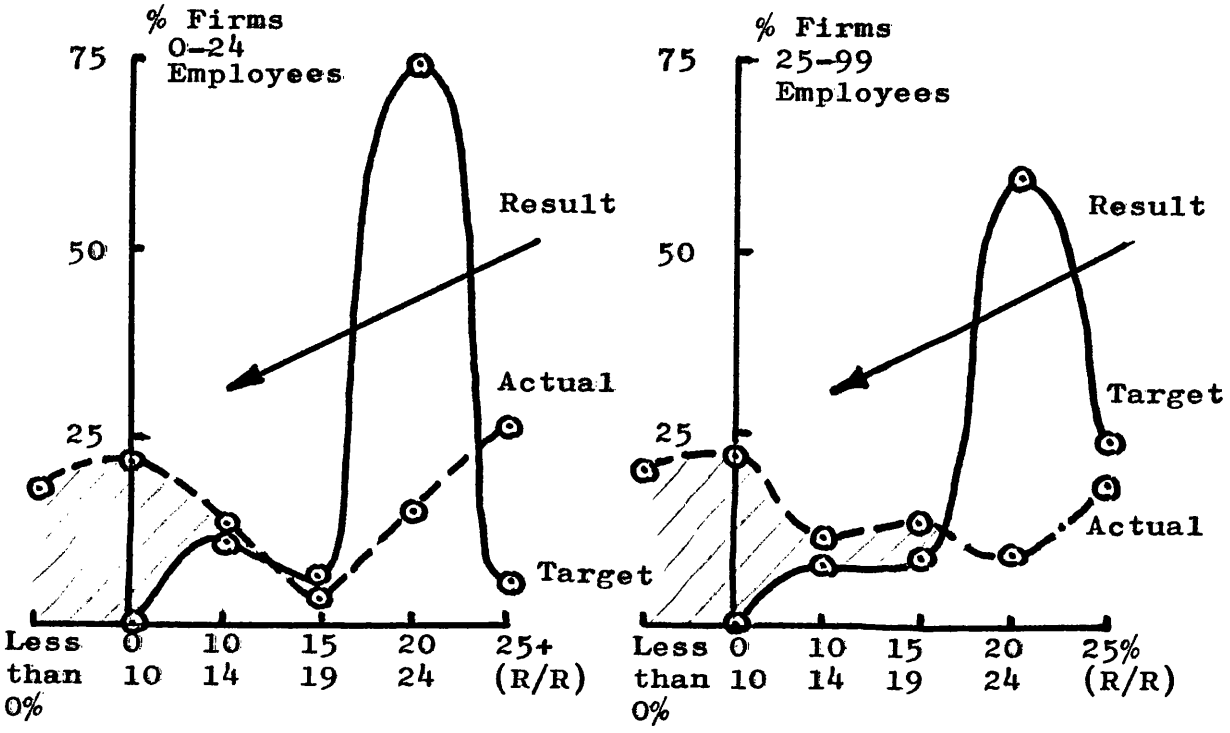
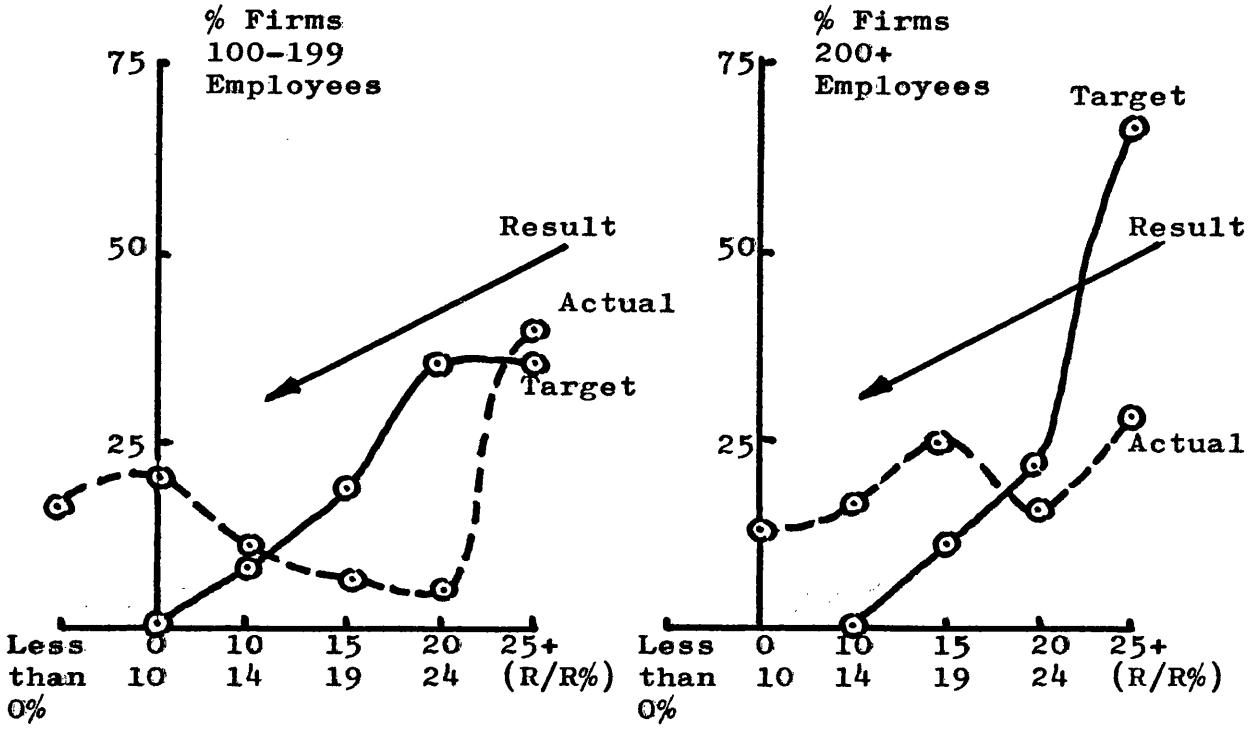


Fig 9.19 Continued



Source: Plymouth Survey Questionnaires;
Questions 71 and 27.
Companies House, Annual Returns, London.

Table 9.17 Achievement of Target Return (Non-Real) on Net Assets by Size of Firm Between 1970-75. Plymouth Survey Full Sample.

	0-24	25-99	100-199	200+	Total Full Sample	Total 38 Sample
Number of R/R calculated.	85	42	49	43	219	
Targets achieved.	38	11	18	14	81	
% Successes	44%	26%	36%	33%	37%	39%
% Failures	56%	74%	64%	67%	63%	61%

Source: Plymouth Survey Questionnaires;
Questions 27 and 71.
Companies House, Annual Returns, London.

Table 9.18 Most Successful and Least Successful Units by Size of Firm; Standard Industrial Classification; and Production Run Category Between 1970-75. Plymouth Survey Full Sample.

Size of Firm:-	0-24	25-99	100-199	200+
Ave. R/R % non-real	17.43%	9.68%	18.62%	21.60%
Number of firms	26	18	12	9
Stand. Ind. Class.	**FDT**	**CAI**	**MME**	**EE**
Ave. R/R % non-real	12.14%	-2.72%	19.58%	15.78%
Number of firms	8	2	23	5
Continued:-	TLCF	BPG	OMG	
Ave. R/R% non-real	19.06%	3.68%	21.26%	
Number of firms	5	4	18	
Prod'n. Run Cat.	**Specialist "A"**	**Differentiator "B"**	**Standardiser "C"**	**Repeater "D"**
Ave. R/R% non-real	19.39%	15.02%	20.13%	12.08%
Number of firms	9	21	22	13

Source: Plymouth Survey Questionnaires; Questions 1, 4, 7 and 26.
Companies House, Annual Returns, London.

COMMENT The 38 firm and full sample data are almost identical in result. Firstly, the actual rates of return of both samples are complementary. Secondly, certain firms not only failed to achieve their targets over the periods, but also failed to reach even the minimum return acceptable. The graphical presentations confirm a definite shifting of the target paths downwards and to the left. Thirdly, whilst 61% of the 38 firm sample failed to reach their targets between 1972-74, with the full sample the failure rate is 63% over the period 1970-75. Fourthly, the most successful units emerged, again, as

the specialist and standardiser firms with 0-24 or 100+ employees in the OMG (and MME) industries. Other industries too recorded satisfactory returns, e.g. TLCF = 19.06% (non-real), but with only 5 firms in the population, the result is somewhat indeterminate. On the other hand, once more the least successful firms were in FDT mainly, with between 25-99 staff and involved in long production runs. This catalogue of results must lend some weight to the basic hypothesis of sub-optimum investment and returns by small firms.

CAPSULE XIII
RETURNS ON INVESTMENT AND SIZE OF FIRM

"In almost every case the U.K. and U.S.A. evidence seems to indicate that when deficit companies are included then profitability and size of firm are independent.....If any association is found then it is very weak.....When positive income companies only are considered, then a weak inverse relationship between size and profitability is observed.....In all cases though the variability of profits is higher in the smaller size classes". (Chapter 6; p 367).

Table 9.19 Average Rate of Return (Non-Real) on Net Assets by Size of Firm Between 1970-75. Plymouth Survey Full Sample.

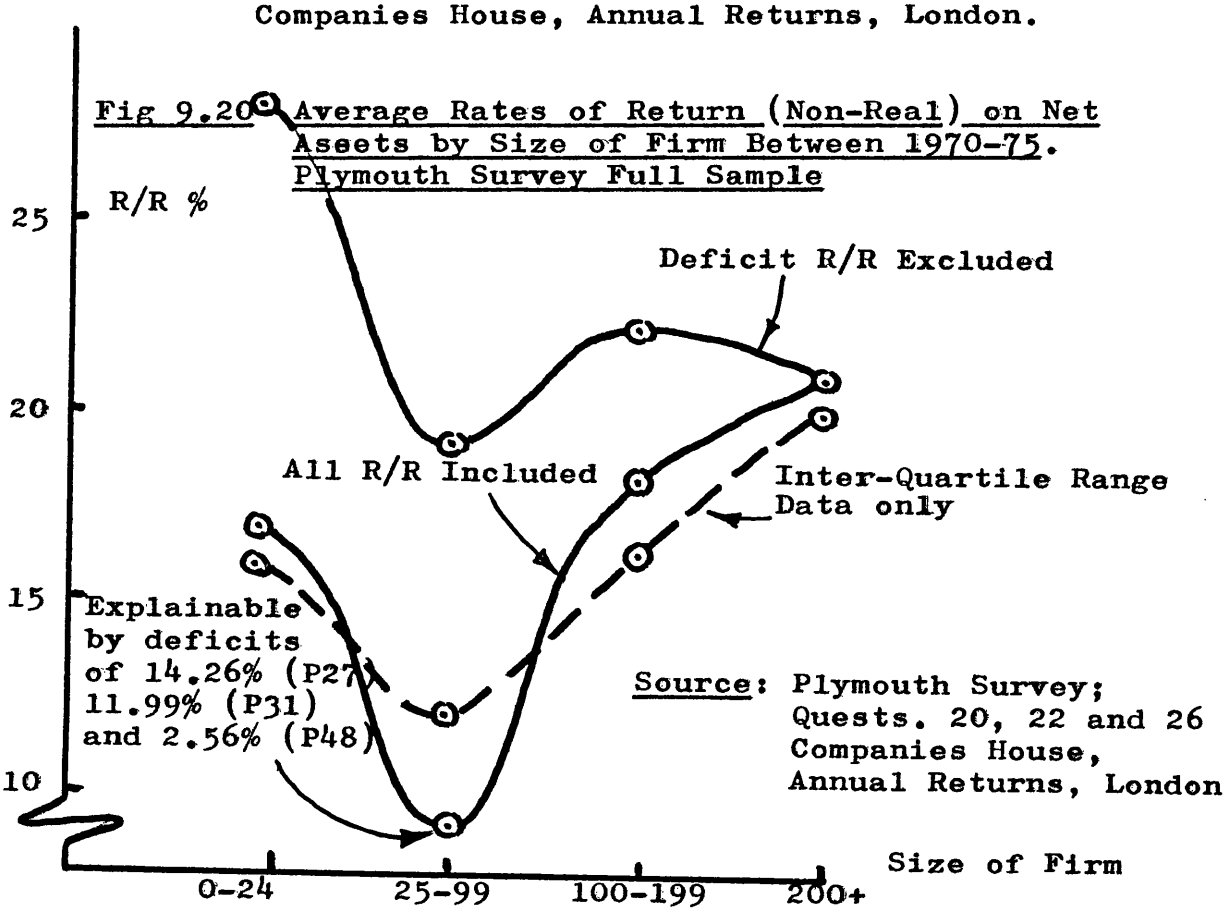
	0-24	25-99	100-199	200+	Overall Mean
No. of firms	26	18	12	9	
Ave. R/R % Deficits Included.	17.43	9.68	18.62	21.60	16.29

Table 9.19 (Continued)

	0-24	25-99	100-199	200+	Overall Mean
Ave. R/R % Deficits Excluded	28.85	19.43	22.77	21.60	23.16
Ave. R/R % Using Inter Quartile Range Data only.	16.47	12.13	16.70	20.27	16.39
Inter-Quartile Range Measure of Dispersion	27.17	19.94	29.27	11.91	
Overall Range.	299.54	195.20	148.50	83.24	

Source: Plymouth Survey Questionnaires;
Questions 20, 22 and 26.
Companies House, Annual Returns, London.

Fig 9.20 Average Rates of Return (Non-Real) on Net Assets by Size of Firm Between 1970-75.
Plymouth Survey Full Sample



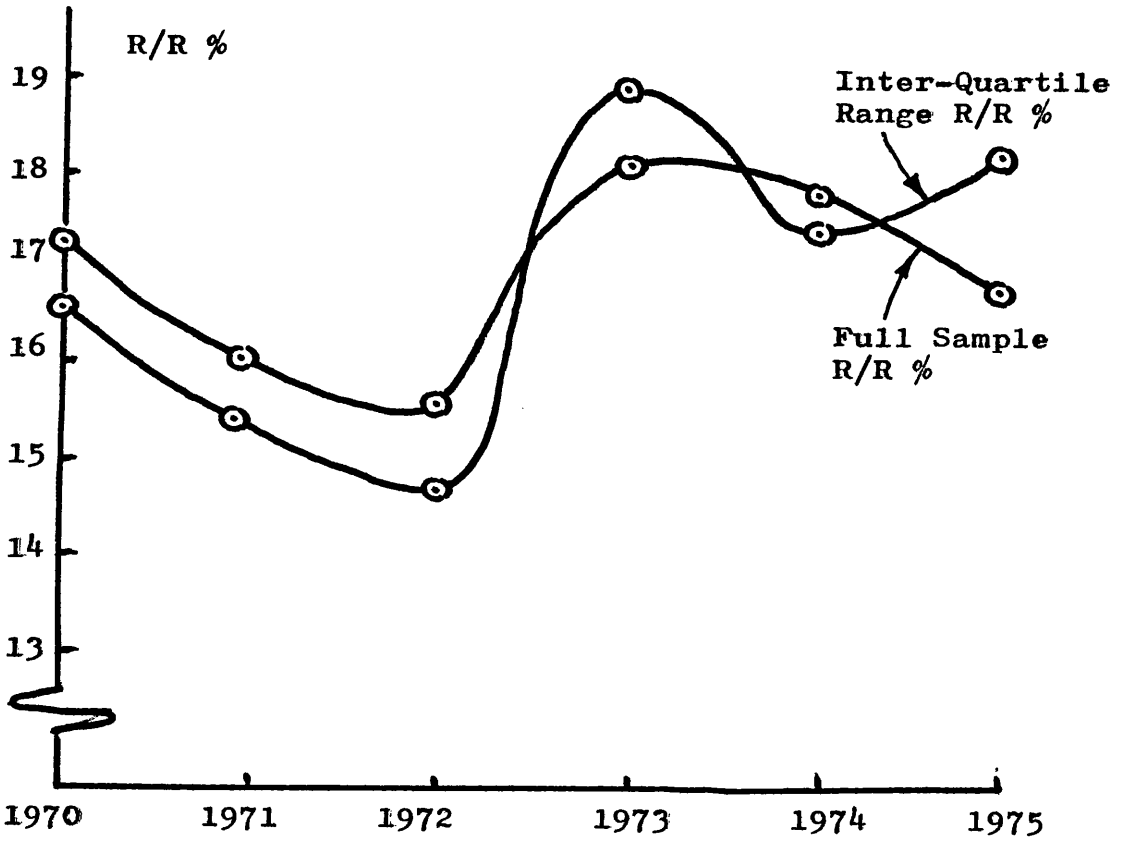
Source: Plymouth Survey;
Quests. 20, 22 and 26
Companies House,
Annual Returns, London

Table 9.20 Average Rates of Return (Non-Real) on Net Assets of Full Sample Firms and Inter-Quartile Range Data Only. Plymouth Survey

	1975	1974	1973	1972	1971	1970	Mean
Full 65 Sample	16.83	17.76	17.99	15.59	16.08	17.24	16.29%
Inter-Quartile Range	18.36	17.63	18.89	14.52	15.52	16.56	16.62%

Source: Plymouth Survey Questionnaires;
Questions 20 and 22.
Companies House, Annual Returns, London.

Fig 9.21 Significant Relationships Between Average R/R (Non-Real) on Net Assets of Full Sample and Inter-Quartile Range Data. Plymouth Survey.



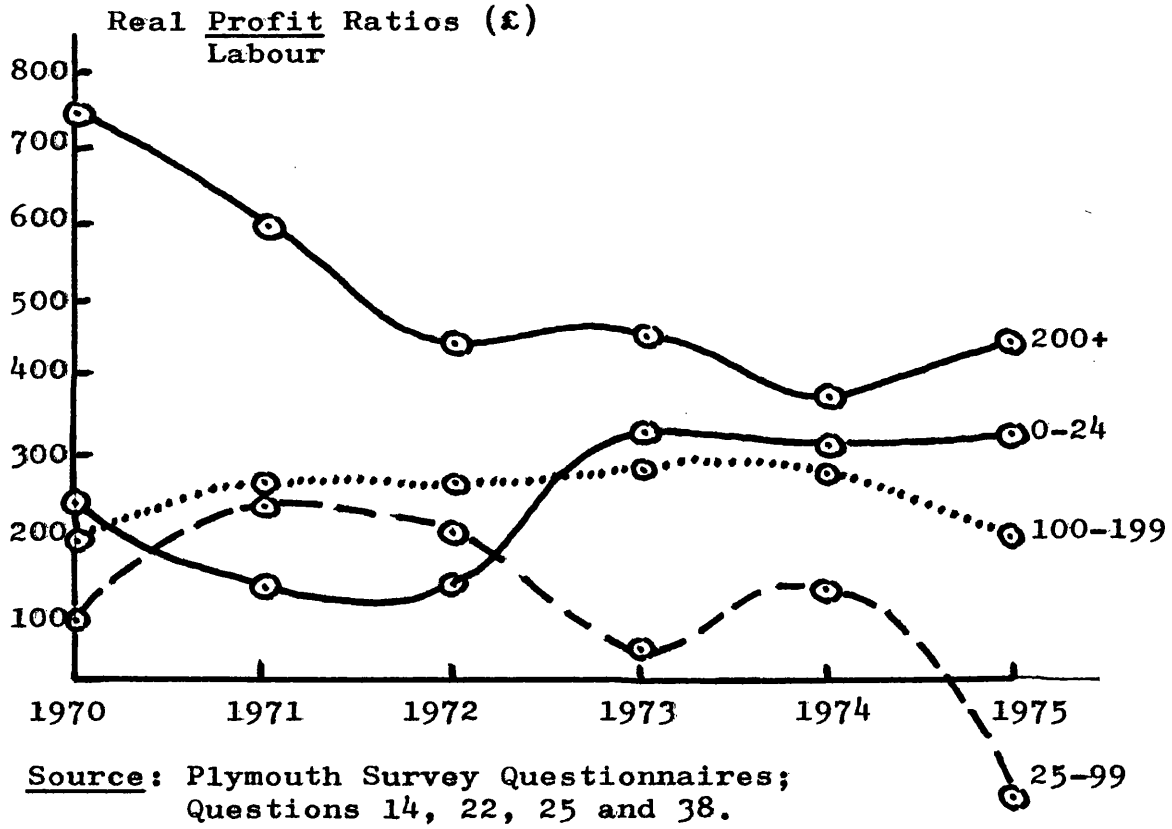
Source: Plymouth Survey; Questions 20 and 22.
Companies House, Annual Returns, London.

Table 9.21 Real Profit/Labour Ratios by Size of Firm Between 1970-75. Plymouth Survey Full Sample

Size of Firm	1975	1974	1973	1972	1971	1970	Means per Group
0-24	£335	£311	£323	£124	£128	£223	£244
25-99	-£76	£126	£55	£198	£223	£97	£103
100-199	£196	£280	£281	£251	£245	£195	£241
200+	£454	£396	£452	£449	£599	£748	£516
Means per Year	£227	£278	£277	£255	£298	£315	£275

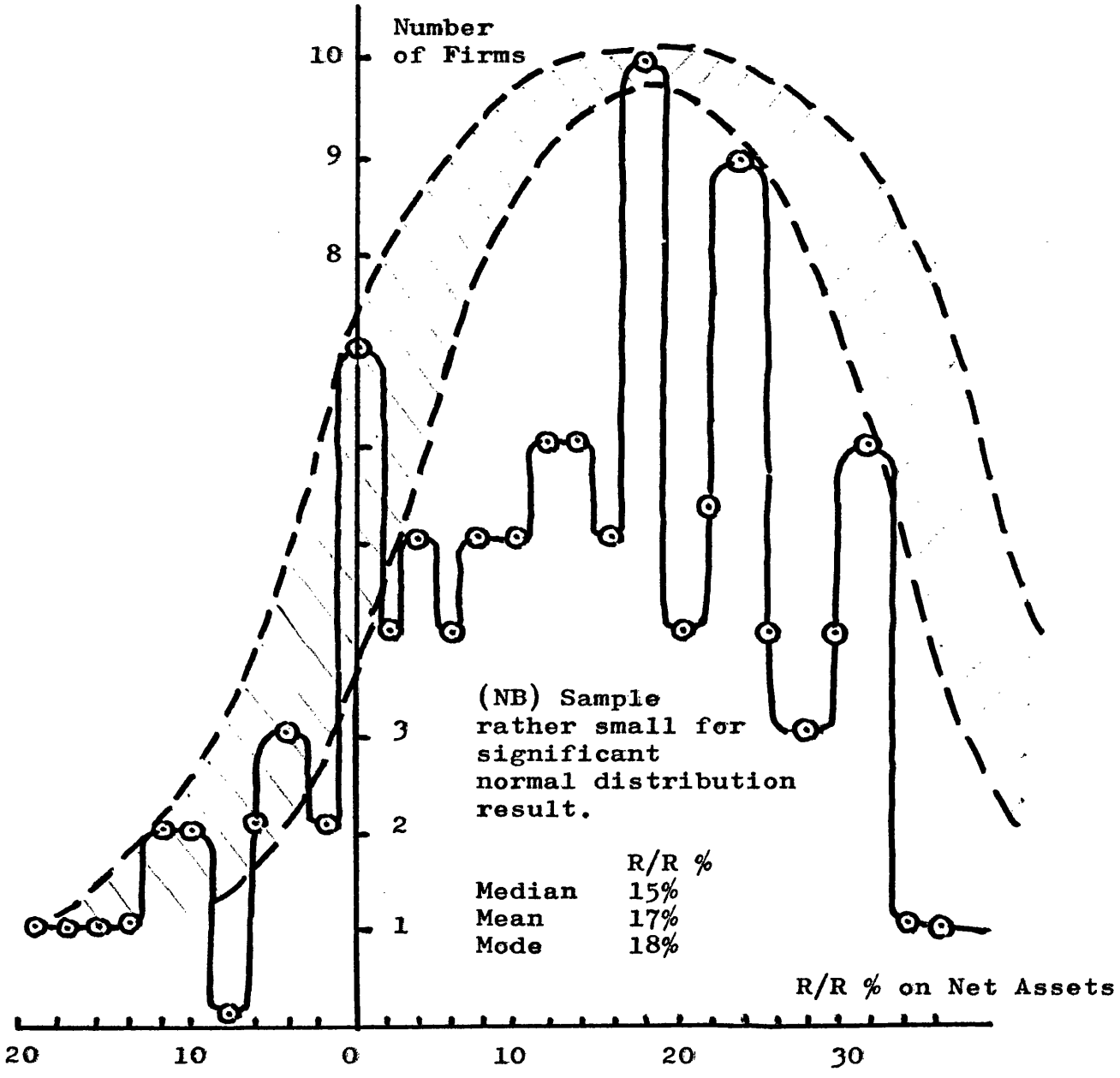
Source: Plymouth Survey Questionnaires;
Questions 14, 22, 25 and 38.
Companies House, Annual Returns, London.

Fig 9.22 Real Profit/Labour Ratios by Size of Firm Between 1970-75. Plymouth Survey Full Sample



Source: Plymouth Survey Questionnaires;
Questions 14, 22, 25 and 38.
Companies House, Annual Returns, London.

Fig 9.23 Distribution of Rates of Return (Non-Real) on Net Assets for Period 1970-75. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires;
Question 26.
Companies House, Annual Returns, London.

COMMENT When all returns are considered, i.e. with the deficits included, or when the inter-quartile range data only are used, profitability and size of firm, up to 200 employees, are apparently unrelated. However, when the n gative returns are excluded, the profitability trend does, indeed, decline with firm size. And an inspection of the range of profitability reveals that it is the smaller units that display the wider dispersions. In these respects the U.K. and U.S.A. research findings outlined in Chapter 6 are principally substantiated. Moreover, whilst the more capital intensive 200+ employee companies produced higher real profit/labour ratios than the smaller firms, this was a falling trend over the period 1970-75. On the other hand, the very small units, i.e. with 0-24 employees recorded a rising trend for the same period. And once again, the 25-99 employee firms recorded an inferior performance. Absolute ratios were generally lower and they showed an overall downward trend.

CAPSULE XIV
INVESTMENT PROFITABILITY

"The figures for the U.K. show a disappointing picture of investment performance for manufacturing industry as a whole over the period 1970-75.....At no stage had investment exceeded that for 1970 in real terms.....In fact, only 21% of the Plymouth Survey sample had considered the issues sufficiently to reach the conclusion that a more positive investment strategy was required..... But perhaps most significant of all was the fact that only 17% actually admitted the possibility that their inadequate investment strategies, expertise, and mathematical appraisals could well have caused financial

performances to be well below those reasonably attainable". (Chapter 6; pp 387-385).

Table 9.22 Average Rates of Return (Non-Real) on Net Assets and Investment/Labour and Investment/Assets Ratios. Plymouth Survey Full Sample - 8 Most Successful and 8 Least Successful Companies.

Code No.	Investment Labour £	Investment Net Assets	Rate of Return on Net Assets %	Target Rate of Return %
P53	21	2.26	74.22	Achieved
P20	765	0.71	47.01	Fail
P35	62	0.027	49.00	Achieved
P24	309	0.236	44.68	Achieved
P19	62	0.158	38.97	Achieved
P21	691	0.124	36.46	Achieved
P59	576	0.168	35.76	Achieved
P61	1731	0.44	30.09	Achieved
Mean:-	527	0.515	44.52	
P64	54	0.058	-152.11	Fail
P49	158	0.337	-57.54	Fail
P38	775	0.203	-25.61	Fail
P27	470	-0.67	-14.26	Fail
P51	64	-0.15	-12.01	Fail
P31	24	0.72	-11.99	Fail
P9	307	0.046	-2.72	Fail
P48	188	0.92	-2.56	Fail
Mean:-	255	0.183	-34.85	

Source: Plymouth Survey Questionnaires;
Questions 21, 22, 31, 35 and 71.
Companies House, Annual Returns, London.

Fig 9.24 Positive Relationship Between Non-Real Investment$_t$ and Non-Real Profit$_{t-1}$. Plymouth Survey Full Sample - Smaller Firms only.

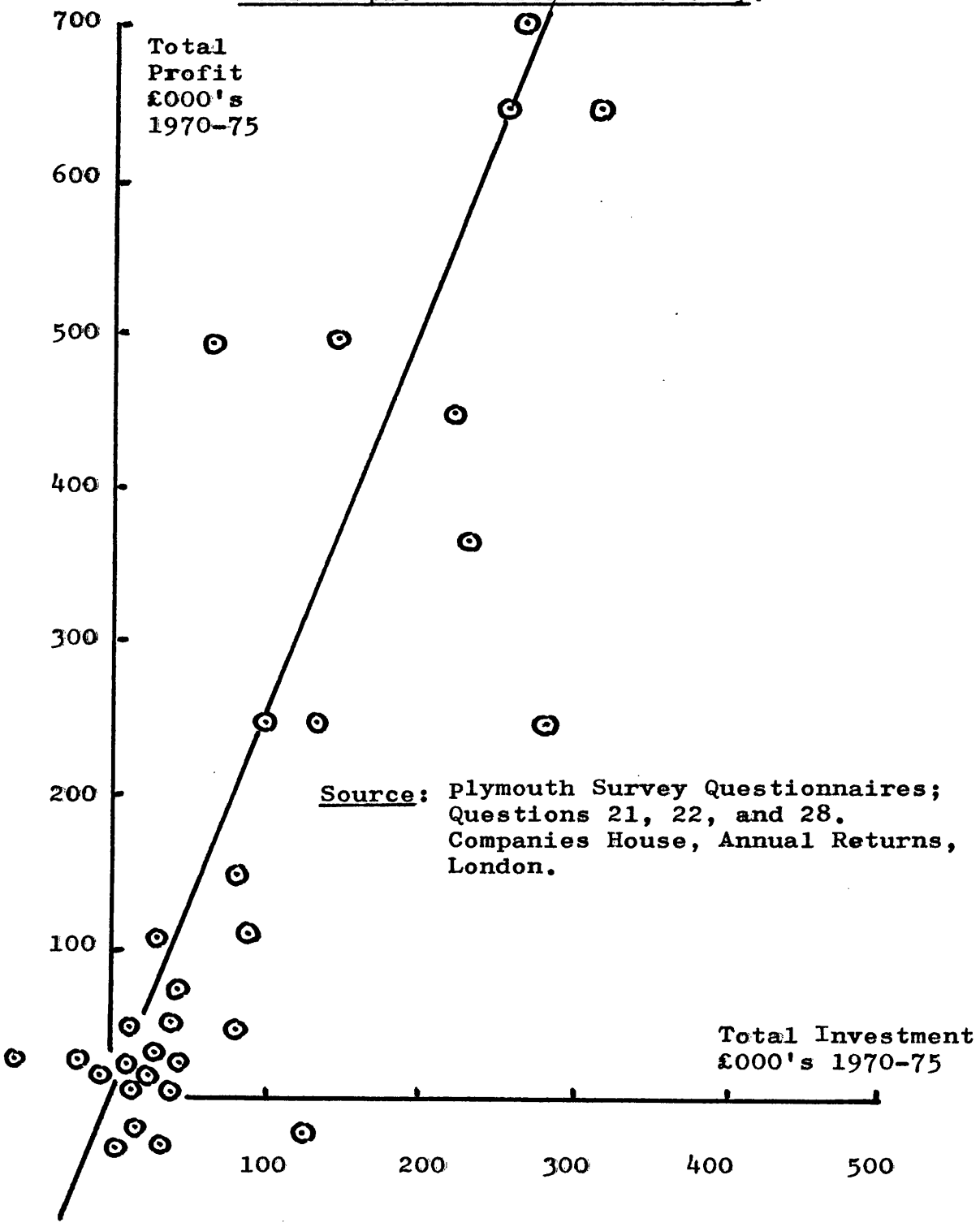
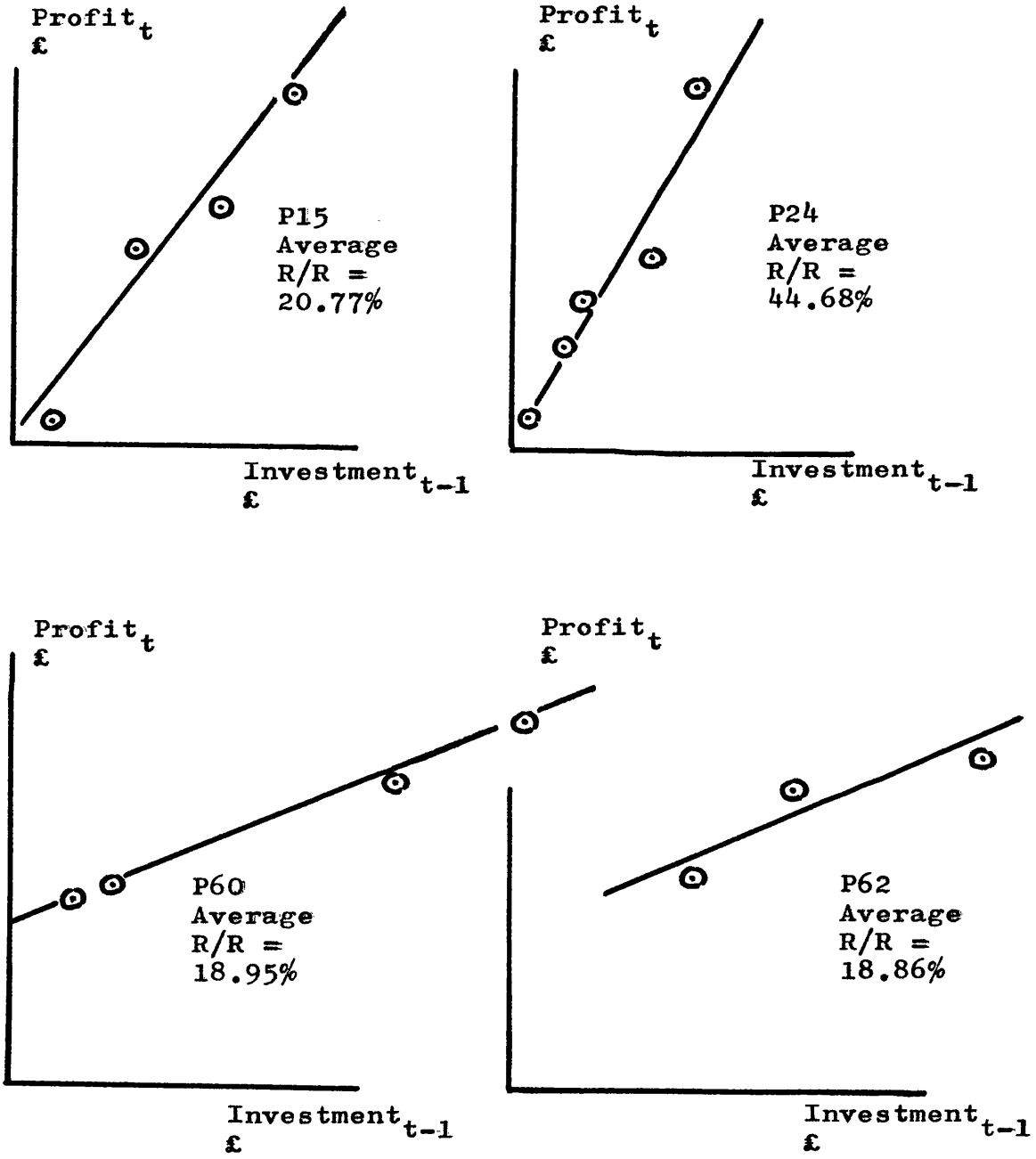


Fig 9.25 Positive Relationships Between Investment$_t$ (Non-Real) and Profit$_{t-1}$ (Non-Real) of Four Successful Firms Between 1970-75. Plymouth Survey - P15; P24; P60; and P62.



Source: Plymouth Survey Questionnaires; Questions 21 and 22 (P15; P24; P60; and P62). Companies House, Annual Returns, London.

COMMENT Firstly, the top eight firms with the highest average rates of return over the period 1970-75 also recorded the highest Investment/Net Assets and Investment/Labour ratios as a whole. Additionally, seven of these eight firms successfully achieved their targets; firm P20 failing to reach a rather optimistic 50%. At the other end of the scale the eight firms with the worst returns were operating on inferior Investment/Net Assets and Investment/Labour ratios in the main. Secondly, $profit_t$ and $investment_{t-1}$ are positively correlated. Four specimen firms, only one appearing in the top eight incidentally, produced remarkable linear relationships. And all four firms' average rates of return over the period 1970-75 were above the overall mean of 16.29% non real. Well planned and sustained investment, whether measured by the Investment/Net assets or Investment/Labour ratios appears to yield results. But too many of the sample firms were clearly not adopting this approach, and in turn, not reaping optimum returns.

CAPSULE XV

INVESTMENT PERFORMANCE AND MANAGEMENT CONSULTANCY

"Some 17% of the 65 firm sample had resorted to outside expertise, e.g. auditors, bankers, accountants, etc., but not specifically for investment purposes.....A further 13% felt that external assistance might be useful and would consider it should the occasion demand..... But 69% of the population had neither employed, not had considered employing, outside expertise for investment purposes". (Chapter 6; p 404). "But a Department of Industry Survey showed that of the firms in their sample, 95% were satisfied or partially satisfied with the con-

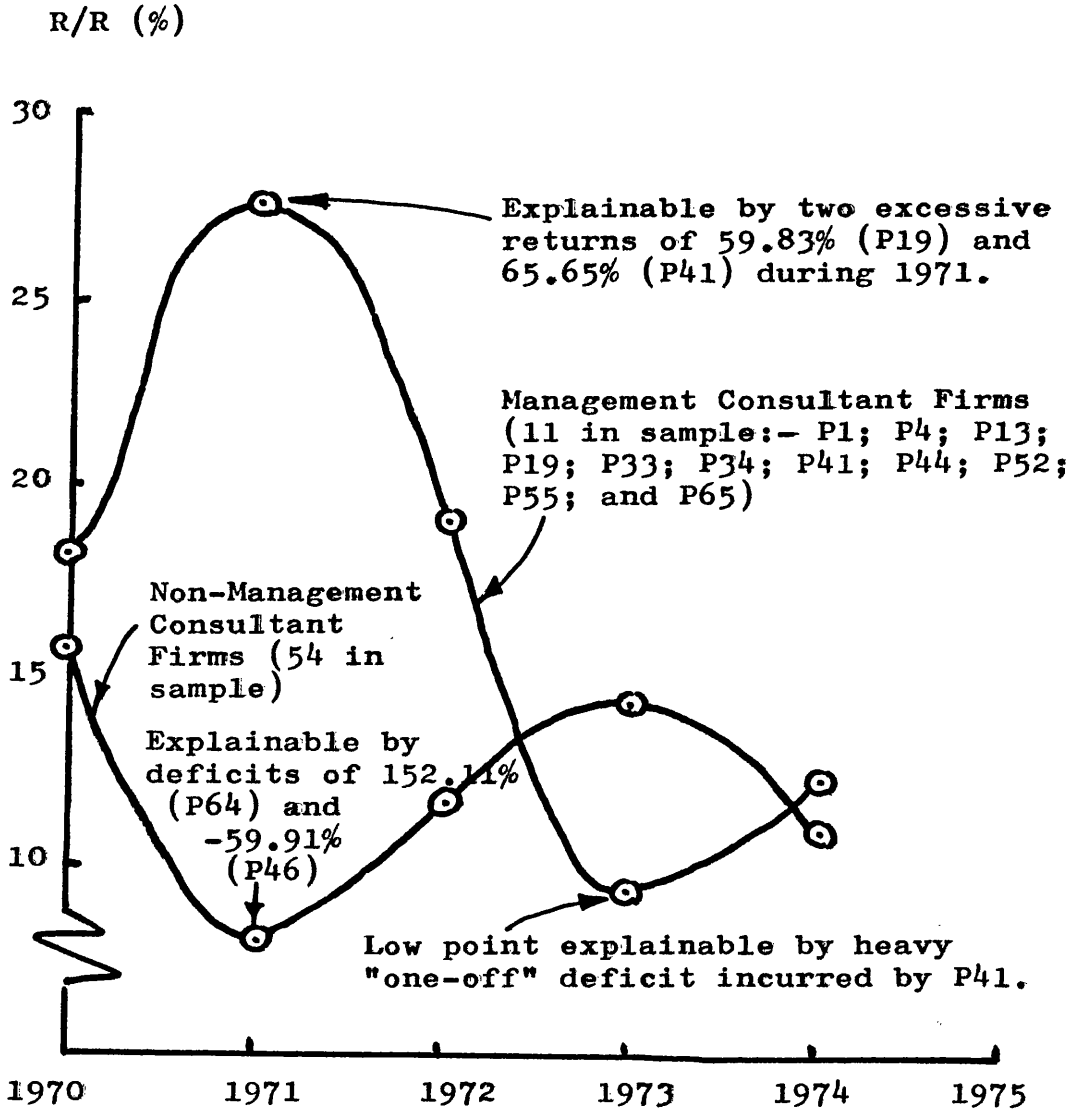
sultants employed; 93% claimed that they had used, or would use, them again; and the net benefits were estimated by the firms themselves to be about 200% on the consultancy fees in the first year alone.....It appeared that the Plymouth Survey firms' strong reservations about consultancy were very much overstated and outside expertise could well have aided the pursuit of investment optimality". (Chapter 6; p 417).

Table 9.23 Average R/R (%) on Net Assets of Firms Employing Management Consultants and Non-Management Consultant Firms Between 1970-75. Plymouth Survey Full Sample.

	1975	1974	1973	1972	1971	1970	Mean
R/R of MC Firms; Non-Real.		19.22	12.39	23.44	31.03	18.35	20.86
R/R of MC Firms; Real.		12.50	9.35	19.33	27.41	18.35	17.38
R/R of Non-MC Firms; Non-Real.		17.47	19.15	14.07	8.89	16.96	15.21
R/R of Non-MC Firms; Real.		11.36	14.46	11.60	7.85	16.96	12.44
R/R (Act) of Full Sample.	16.83	17.76	17.99	15.59	16.08	17.24	16.29
R/R(Real) of Full Sample.	8.81	11.55	13.58	12.86	14.20	17.24	12.52
R/R Inter Quartile Range.	18.36	17.63	18.89	14.52	13.76	16.56	16.62
R/R(Real) Inter Quartile Range.	9.61	11.47	14.26	11.98	12.15	16.56	12.67
Inflation Index.	190.9	153.7	132.4	121.2	113.2	100.0	

Source: Plymouth Survey Questionnaires;
Questions 20, 22 and 78.
Companies House, Annual Returns, London.

Fig 9.26 Comparison Between Average R/R (Real) of Firms Employing Management Consultants and Non-Management Consultant Firms Between 1970-75. Plymouth Survey Full Sample.



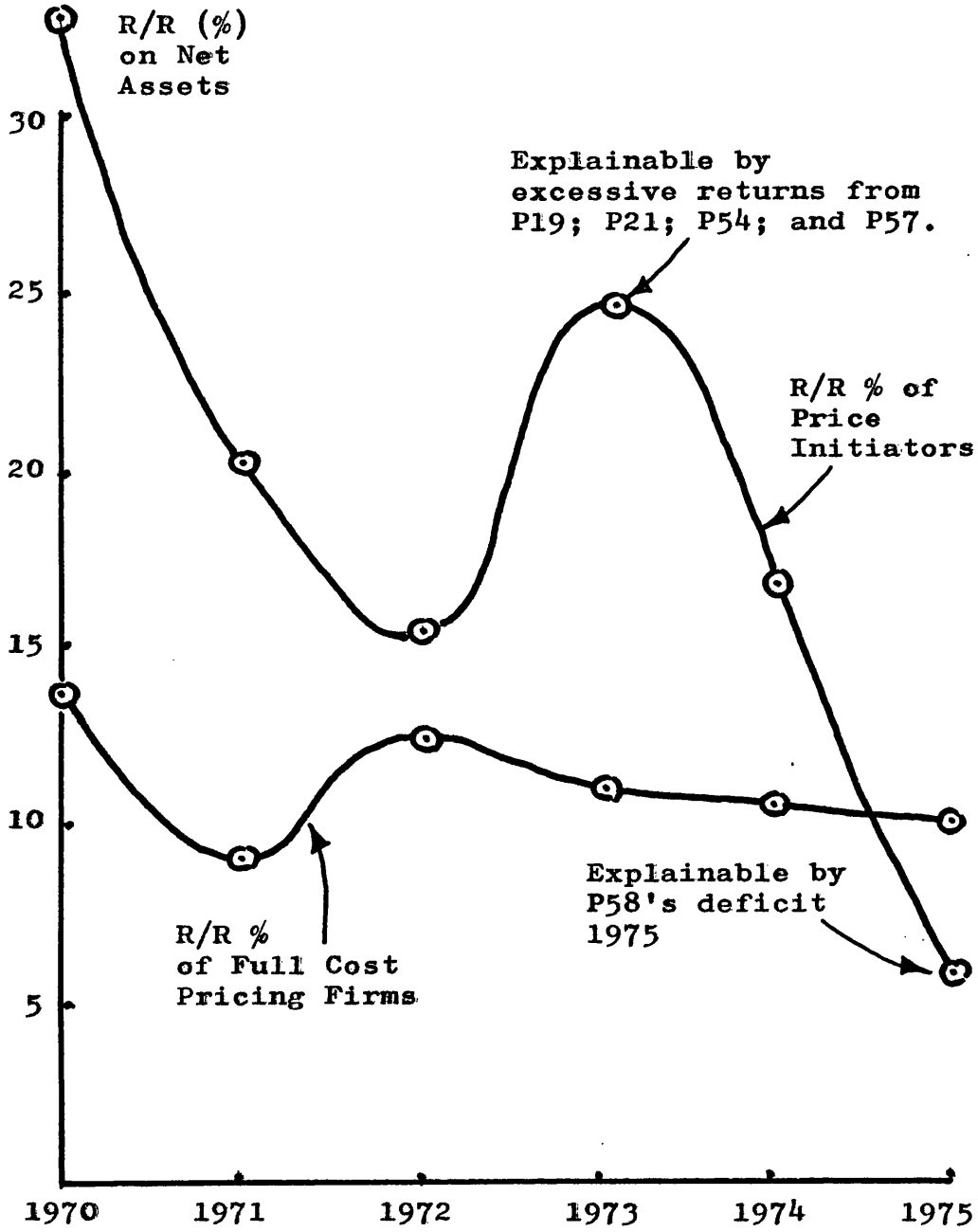
Source: Plymouth Survey Questionnaires;
Questions 20, 22 and 78.
Companies House, Annual Returns, London.

COMMENT A sample of a mere 11 pro-management consultant firms out of 65 is probably too small to be meaningful. Nevertheless, Companies House financial data reveal that the rates of return on net assets of these firms were superior to the non-management consultant companies. An exception occurred in 1973 when one firm, P41, sustained a severe, but explainable, deficit. Moreover, much of the consultancy had taken place in the early 1970's and the returns for this period were, in fact, exceptional. On the evidence available, it did indeed appear that management consultancy had manifested itself in the form of improved returns in much the same way as reported by the Department of Industry Survey.

CAPSULE XVI
INVESTMENT PERFORMANCE AND FULL COST PRICING

"In total, 56 firms (86%) employed a cost based price and this finding was evenly spread over all four sizes of firm.....And the extracts tended to support the various contributors who have claimed that pricing was determined by the C+% method.....No firm in the Plymouth Survey fixed price by the marginal cost = marginal revenue rule, and only 9 concerns (14%) could be described as price initiators, i.e. employing flexible pricing in relation to rivalry, and what the market would pay.....It could be argued, of course, that price leadership by certain large firms reduced many of the small firms in question to price takers, but even so, some concerns at least, could and should have employed a little more flexibility in their pricing if returns were to be optimised". (Chapter 7; pp 429-437).

Fig 9.27 Comparison Between Real Rates of Return on Net Assets of Price Initiators and Full Cost Pricing Firms Between 1970-75. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 20, 22, 26 and 79.
Companies House, Annual Returns, London.

Table 9.24 Real Rates of Return on Net Assets of Price Initiators and Full Cost Pricing Firms Between 1970-75. Plymouth Survey Full Sample.

	1975	1974	1973	1972	1971	1970	Mean
R/R (Act) of Price Initiators 9 firms.	10.09	24.79	32.85	18.30	22.98	33.41	24.55
R/R(Real) of Price Initiators 9 firms.	5.28	16.12	24.81	15.09	20.30	33.41	19.16
R/R (Act) of Full Cost Pricers 56 Firms.	19.52	16.40	14.94	15.07	10.50	14.46	14.51
R/R(Real) of Full Cost Pricers 56 Firms.	10.22	10.67	11.28	12.43	9.27	14.46	11.38
R/R (Act) of Full Sample 65 Firms.	16.83	17.76	17.99	15.59	16.08	17.24	16.29
R/R(Real) of Full Sample 65 Firms.	8.81	11.55	13.58	12.86	14.20	17.24	12.52
Inflation Index.	190.9	153.7	132.4	121.2	113.2	100.0	

Source: Plymouth Survey Questionnaires;
Questions 20, 22, 26 and 79.
Companies House, Annual Returns, London.

COMMENT It has already been shown in Chapter 7 that 8 of the 9 price initiators were part of the 38 firm sample. And an examination of these 8 firms revealed that 7 of them generally achieved their target rates of return between 1972-74 whilst the degree of success for the firms employing rigid pricing methods was considerably lower. (Chapter 7; p 441). The results of the 65 firm sample

covering the period 1970-75 were similar in the sense that rates of return of the price initiators notably exceeded those of the C+% pricers with just one exception in 1975. Significantly, of the 9 price initiators, 6 were specialist "A" companies engaged primarily in one-offs and small batches; 2 were production run category "B" firms; and 1 was classified "C". Thus, in the majority of these cases, pricing had to be individual, flexible, and geared not only to costs but also to market forces. Furthermore, whilst rigid pricing based entirely upon costs will certainly not lead to maximum profit, it is nevertheless analogous to the satisficing behaviour described by H. A. Simon giving rise to satisficing returns on investment but no more.

CAPSULE XVII
INVESTMENT RETURNS AND PROFIT MARGINS

"The target rate of return and mark-up on costs are mathematically related to the ratio of sales/net assets..... Some 61% of the Plymouth Survey sample had failed to reach their targets in the period under review (1972-74) .....But the firms failing to reach their targets could hardly have done otherwise with the ultimate % mark-ups employed.....The findings demonstrated clearly the lack of mathematical harmony between the target rate of return and the average % mark-up taken from the firms' annual returns at Companies House, London". (Chapter 7; pp 461-463).

Table 9.25 Target Rates of Return; Sales/Net Assets Ratios; Mark-Ups Required; Actual Mark-Ups; and Actual Rates of Return (Non-Real). Plymouth Survey Full Sample 1970-75.

Code Nos.	Target R/R %	Sales Assets Ratio	Mark-ups Required %	Actual Average Mark-ups %	Actual R/R % on Net Assets	Comments Regarding Mark-ups (MU)
P1	50	4.28	11.68	5.80	24.86	Wrong MU
P2	20	1.50	13.33	3.29	4.94	Wrong MU
P4	25	1.61	15.52	16.55	26.66	Adequate MU
P5	20	2.40	8.33	0.86	2.07	Wrong MU
P6	22.5	7.71	2.91	1.63	12.60	Wrong MU
P7	10	2.10	4.76	1.28	2.70	Wrong MU
P8	33	2.62	12.59	3.85	10.11	Wrong MU
P9	20	1.43	13.98	-1.90	-2.72	Wrong MU
P11	15	2.03	7.38	2.46	5.00	Wrong MU
P12	15	1.84	8.15	6.08	11.20	Wrong MU
P14	40	1.48	27.02	2.47	3.67	Wrong MU
P15	20	1.96	10.20	10.59	20.77	Adequate MU
P16	20	4.39	4.55	6.32	27.78	Adequate MU
P19	25	8.10	3.08	4.81	38.97	Adequate MU
P20	50	15.45	3.23	3.04	47.01	Wrong MU
P21	20	7.13	2.80	5.11	36.46	Adequate MU
P24	33	4.23	7.80	10.56	44.68	Adequate MU
P25	50	1.09	45.87	15.96	17.40	Wrong MU
P26	50	2.14	23.36	0.61	1.32	Wrong MU
P27	20	3.92	5.10	-3.63	-14.26	Wrong MU
P28	20	3.83	5.22	5.40	20.71	Adequate MU
P30	22.5	2.33	9.65	4.18	9.76	Wrong MU
P31	15	63.39	0.23	-0.18	-11.99	Wrong MU
P32	20	3.22	6.21	6.50	20.95	Adequate MU
P34	20	2.81	7.11	4.74	13.32	Wrong MU
P35	20	3.14	6.36	15.60	49.00	Adequate MU
P36	33	3.71	8.89	6.65	24.69	Wrong MU

Table 9.25 (Continued)

Code Nos.	Target R/R %	Sales Assets Ratio	Mark-ups Required %	Actual Average Mark-ups %	Actual R/R % on Net Assets	Comments Regarding Mark-ups (MU)
P38	20	2.94	6.80	-8.71	-25.61	Wrong MU
P39	22	7.79	2.82	2.51	19.56	Wrong MU
P41	33	8.13	4.05	1.98	16.16	Wrong MU
P42	20	3.98	5.02	5.36	21.36	Adequate MU
P46	20	5.72	3.49	0.64	3.68	Wrong MU
P48	10	1.69	5.91	-1.51	-2.56	Wrong MU
P49	50	3.40	14.70	-16.92	-57.54	Wrong MU
P50	20	10.71	1.86	1.20	12.87	Wrong MU
P51	12.5	2.42	5.16	-4.96	-12.01	Wrong MU
P52	20	2.80	7.14	5.10	14.31	Wrong MU
P53	20	12.76	1.56	5.81	74.22	Adequate MU
P54	20	2.73	7.32	10.27	28.05	Adequate MU
P55	20	13.91	1.43	2.08	29.05	Adequate MU
P57	33	3.64	9.06	7.68	27.99	Wrong MU
P58	20	1.79	11.17	1.45	2.60	Wrong MU
P59	10	6.61	1.51	5.40	35.76	Adequate MU
P60	25	4.08	6.12	4.64	18.95	Wrong MU
P61	20	7.37	2.71	4.08	30.09	Adequate MU
P62	15	2.56	5.85	7.36	18.86	Adequate MU
P65	40	2.75	14.54	4.99	13.72	Wrong MU

Source: Plymouth Survey Questionnaires;
Questions 20, 22, 26, 32, 34 and 71.
Companies House, Annual Returns, London.

The following table now shows a comparison of correct and incorrect mark-ups using three separate sets of data, but all taken from the Plymouth Survey over the period 1970-75.

Table 9.26 Comparison of Correct and Incorrect Mark-Ups Using Three Sets of Data. Plymouth Survey.

	Full Sample All Returns 1970-75	38 Firm Sample Average Returns 1972-74	Full Sample Average Yearly Returns 70-75
Correct MU Employed.	37%	39%	34% (as Table 9.25)
Incorrect MU Employed	63%	61%	66% (as Table 9.25)

Source: Plymouth Survey Questionnaires;
Questions 20, 22, 26, 32, 34 and 71.
Companies House, Annual Returns, London.

COMMENT After analysing three separate sets of data from the Plymouth Survey, it is confirmed that at least 61% of the sample could not have achieved the targets set by the firms themselves with the mark-ups employed. Even after allowing for adverse market conditions when losses were inevitable for some companies, it still remains true that others were simply not co-ordinating the mark-up on costs with the required target rate of return. In short, for many firms the formula:-

$$\text{Mark-up} = \text{Target R/R} \times \frac{\text{Net Assets}}{\text{Sales}}$$

was presumably unknown.

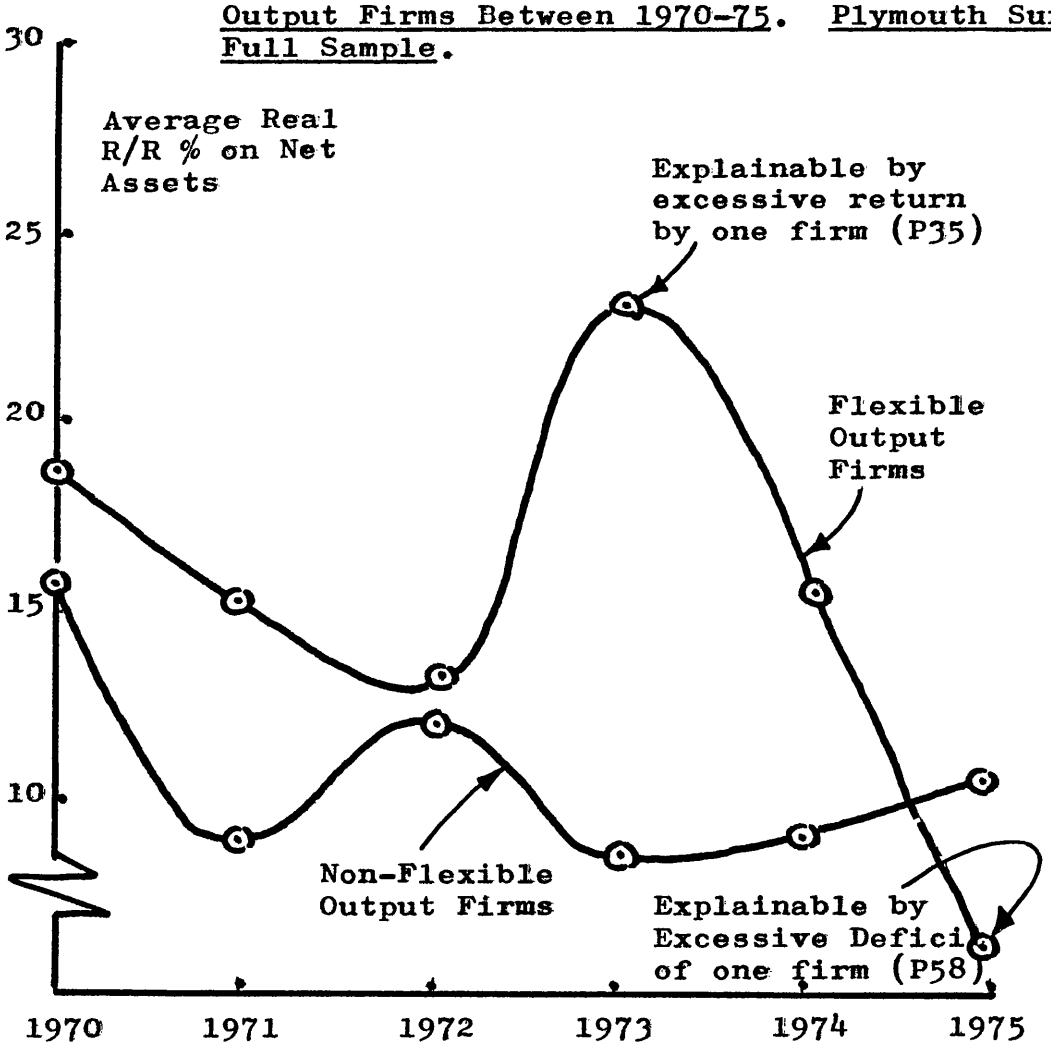
CAPSULE XVIII

INVESTMENT PERFORMANCE AND OUTPUT FLEXIBILITY

"Successful output fixing requires rather more thought than simply allocating fixed quotas of work.....A certain flexibility is needed.....But almost 50% of the firms fixed output by allocating quotas which would be retained until events dictated otherwise.....Even more striking was the finding that 23% actually employed a constant

output policy.....In fact only 19 firms (29%) were scheduling output in response to market forces implying reasonable degrees of flexibility.....It is suggested that firms displaying a marked inflexibility of output fixing would be unlikely to optimise profits, and in turn, returns on net assets". (Chapter 8; pp 533-542).

Fig 9.28 Comparison of Average Real Rates of Return (%) on Net Assets of Flexible and Non-Flexible Output Firms Between 1970-75. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 20, 22, 26, 89, 90 and 91. Companies House, Annual Returns, London.

Table 9.27 Average Rates of Return (%) on Net Assets of Flexible and Non-Flexible Output Firms Between 1970-75. Plymouth Survey Full Sample.

	1975	1974	1973	1972	1971	1970	Mean
Average R/R (Act) of Flexible Output Firms 19 (29%).	12.37	24.20	31.66	16.41	17.56	19.76	20.32
Average R/R (Real) of Flexible Output Firms 19 (29%).	6.47	15.74	23.91	13.53	15.51	19.76	15.82
Average R/R (Act) of Non-Flexible Output Firms 46 (71%).	19.31	14.67	11.65	15.24	10.34	16.06	14.54
Average R/R (Real) of Non-Flexible Output Firms 46 (71%).	10.11	9.54	8.79	12.57	9.13	16.06	11.03
Average R/R (Act) All Firms Full Sample.	16.83	17.76	17.99	15.59	16.08	17.24	16.29
Average R/R (Real) All Firms Full Sample.	8.81	11.55	13.58	12.86	14.20	17.24	12.52
Inflation Index.	190.0	153.7	132.4	121.2	113.2	100.0	

Source: Plymouth Survey Questionnaires;
Questions 20, 22, 26, 89, 90 and 91.
Companies House, Annual Returns, London.

COMMENT The statistics, highlighting superior profitability for the flexible output firms, also add some support to the findings in Capsule XVI where the 9 firms practising flexible pricing also recorded higher returns on net

assets. It is probably no accident that out of these 9 specialist firms, 8 were included in the 19 companies practising flexible output. Output rigidity would, on the evidence available, appear to erode the possibilities of optimum investment performance.

CAPSULE XIX
INVESTMENT PERFORMANCE AND EXCESS CAPACITY

"The average level of excess capacity for the 65 firm Plymouth sample was 16.21% over the period 1970-75..... The majority of the companies were committed to some degree of subsidiary production, but there was no evidence that this was specifically employed for the reduction of excess capacity.....The majority did not undertake profitable market research, market seeking, or even advertising, despite persistent excess capacities.....And although there was no apparent relationship between the level of excess capacity and the achievement (or otherwise) of target returns on net assets, there was a negative correlation of 0.277 between excess capacity and actual returns (38 firm sample 1972-74).....The falling short of optimum returns could almost certainly have been eased by the application of basic marketing skills impliedly lacking, for example, in the excess capacity figures". (Chapter 8; pp 589-590).

Table 9.28 over-page provides an opportunity to compare average % levels of excess capacity with average % returns on net assets for the Plymouth Survey over the period 1970-75.

Table 9.28 Average % Levels of Excess Capacity and Average % Returns (Non-Real) on Net Assets Between 1970-75. Plymouth Survey Full Sample.

Code Number	Excess Capacity %	Rate of Return on Net Assets	Code Number (Cont.)	Excess Capacity %	Rate of Return on Net Assets
P1	5%	24.98%	P33	15%	13.32%
P2	25%	4.94%	P35	15%	49.0%
P4	10%	26.66%	P36	25%	24.69%
P5	15%	2.07%	P38	20%	-25.61%
P6	25%	12.6%	P39	10%	19.56%
P7	22%	2.7%	P41	25%	16.16%
P8	nil	10.11%	P42	10%	21.36%
P9	15%	-2.72%	P46	20%	3.68%
P11	15%	5.0%	P48	35%	-2.56%
P12	10%	11.2%	P49	17.5%	-57.54%
P14	5%	3.67%	P50	20%	12.87%
P15	14%	20.77%	P51	20%	-12.01%
P16	5%	27.78%	P52	15%	14.31%
P17	15%	18.94%	P53	10%	74.22%
P19	20%	38.97%	P54	25%	28.05%
P20	12%	47.01%	P55	10%	29.05%
P21	15%	36.46%	P57	20%	27.99%
P24	10%	44.68%	P58	20%	2.6%
P25	7.5%	17.4%	P59	15%	35.76%
P26	20%	1.32%	P60	20%	18.95%
P27	20%	-14.26%	P61	25%	30.09%
P28	20%	20.71%	P62	nil	18.86%
P30	10%	9.76%	P63	25%	12.64%
P31	20%	-11.99%	P65	25%	13.72%
P32	15%	20.95%			

Source: Plymouth Survey; Quests. 20, 22, 26 and 93. Companies House, Annual Returns, London.

It might be noted that only 16 firms (24.61%) of the full Plymouth sample had excess capacities of less than 10% for the period 1970-75.

Table 9.29 Covariances, Standard Deviations, and Coefficients of Correlation of Full and 38 Firm Samples. Plymouth Survey. Excess Capacities and Returns on Net Assets 1970-75.

Sample	Covariance (a)	Standard Deviation of Excess Capacity (b)	Standard Deviation of R/R on Net Assets (c)	Coefficient of Correlation $r = \frac{(a)}{(b)(c)}$	r^2
Full Sample.	-36.28	7.16	20.39	-0.248	0.0615
38 Firm Sample.	-52.23	6.42	29.28	-0.277	0.0767

Source: Plymouth Survey Questionnaires (38 and Full Samples); Questions 20, 22, 26 and 93.
Companies House, Annual Returns, London.

Table 9.30 Average % Levels of Excess Capacity and Average % Rates of Return on Net Assets (Non-Real) of Deficit Companies only. Plymouth Survey 38 and Full Samples.

Code	XC(38)	R/R(38)	Code	XC(Full)	R/R(Full)
P27	20%	-45.3%	P9	15%	-2.72%
P31	20%	-6.41%	P27	20%	-14.26%
P38	20%	-49.01%	P31	20%	-11.99%
P41	25%	-25.49%	P38	20%	-25.61%
P49	17.5%	-57.54%	P48	35%	-2.56%
			P49	17.5%	-57.54%
			P51	20%	-12.01%
Mean:-	20.5%	-36.75%	Mean:-	21%	-18.09%
All Firms Full Sample Mean:-				16.21%	16.29%

Source: Plymouth Survey Questionnaires; Questions 20, 22, 26 and 93.
Companies House, Annual Returns, London.

COMMENT The coefficient of correlation between excess capacity and returns on capital for the full Plymouth sample (1970-75) was -0.248. This compared with -0.277 recorded for the 38 firm sample (1972-74). Moreover, all the deficit companies, in both samples, had high levels of excess capacity. Whilst the correlations could not be regarded as highly significant, they nevertheless, indicate that prolonged unused capacity of around 16% and over becomes a variable which adversely affects returns on capital employed. Unfortunately, only 24.61% of the sample (16 firms) had excess capacities of 10% or less, a level considered to be barely acceptable by most interviewees.

CAPSULE XX
INVESTMENT PERFORMANCE AND OUTPUT GROWTH

"In essence, only 28 firms (43% of the 65 firm sample), could be described as growth conscious.....Regarding the 38 firm sample, out of the 15 firms (40%) who were growth conscious, 9 (60%) successfully achieved their target returns on net assets.....The average increase in sales and the average return on net assets over the period 1972-74 were 25.13% and 23.48% respectively..... In contrast, out of the 23 non-growth conscious firms, only 6 (27%) reached their targets - the average increase in sales and the average returns on net assets for the same period being only 10.26% and 12.77%.....It seems reasonable to suppose from these figures that it pays to adopt a growth policy". (Chapter 8; pp 598-600).

Table 9.31 Average Annual Increase in Sales and Average Rates of Return (Non-Real) on Net Assets Between 1970-75. Plymouth Survey Full Sample

Code Nos.	Average Increase in Sales	Average R/R on N.A.	Code Nos. (Cont.)	Average Increase in Sales	Average R/R on N.A.
P1	21.22%	24.86%	P34	7.8%	13.32%
P2	8.32%	4.94%	P35	17.64%	49.0%
P4	8.47%	26.66%	P36	12.23%	24.69%
P5	28.5%	2.07%	P38	16.24%	-25.61%
P6	23.08%	12.66%	P39	13.58%	19.56%
P7	-2.11%	2.7%	P41	13.04%	16.16%
P8	4.9%	10.11%	P42	8.64%	21.36%
P9	1.96%	-2.72%	P46	12.04%	3.68%
P11	17.31%	5.0%	P48	3.47%	-2.56%
P12	18.6%	11.2%	P49	-26.4%	-57.54%
P14	29.2%	3.67%	P50	22.7%	12.87%
P15	15.14%	20.77%	P51	5.85%	-12.01%
P16	8.48%	27.78%	P52	32.14%	14.31%
P19	23.03%	38.97%	P53	21.63%	74.22%
P20	76.04%	47.01%	P54	26.59%	28.05%
P21	11.58%	36.46%	P55	102.8%	29.05%
P24	31.59%	44.68%	P57	6.67%	27.99%
P25	2.63%	17.4%	P58	36.62%	2.6%
P26	4.11%	1.32%	P59	24.53%	35.76%
P27	21.17%	-14.26%	P60	14.89%	18.95%
P28	58.22%	20.71%	P61	49.89%	30.09%
P30	26.88%	9.76%	P62	20.54%	18.86%
P31	18.0%	-11.99%	P65	10.55%	13.72%
P32	20.48%	20.95%			

Source: Plymouth Survey Questionnaires;
Questions 15, 20, 22 and 26.
Companies House, Annual Returns, London.

Table 9.32 Average Sales Growth % Per Annum and Average % Rates of Return on Net Assets of Growth Consicous and Non-Growth Conscious Firms Between 1970-75. Plymouth Survey Full Sample

	1975	1974	1973	1972	1971	1970	Mean
Ave. % Growth of Sales p.a. of Growth Conscious Firms, (Non-Real).	23.96	26.93	33.57	12.75	21.44		23.73
				(38 Firm Sample Mean			25.13)
Ave. % Growth of Sales p.a. of Non-Growth Conscious Firms, (Non-Real).	24.40	19.19	11,41	11.50	18.63		17.02
				(38 Firm Sample Mean			10.26)
Ave. R/R on N.A. of Growth Conscious Firms (28 = 43%) (Non-Real).	17.57	20.64	27.67	15.69	19.34	25.71	21.10
				(38 Firm Sample Mean			23.48)
Ave. R/R on N.A. of Growth Conscious Firms (28 = 43%) (Real).	9.20	13.42	20.89	12.94	17.08	25.71	16.54
Ave. R/R on N.A. of Non-Growth Conscious Firms (37 = 57%) (Non-Real)	16.08	15.31	8.78	15.52	7.81	9.91	12.23
				(38 Firm Sample Mean			12.77)

Table 9.32 (Continued)

	1975	1974	1973	1972	1971	1970	Mean
Ave. R/R on N.A. of Non-Growth Conscious Firms (37 = 57%) (Real).	8.42	9.96	6.63	12.80	6.89	9.91	9.10
Inflation Index.	190.9	153.7	132.4	121.2	113.2	100.0	

Source: Plymouth Survey Questionnaires;
Questions 15, 20, 22 and 26.
Companies House, Annual Returns, London.

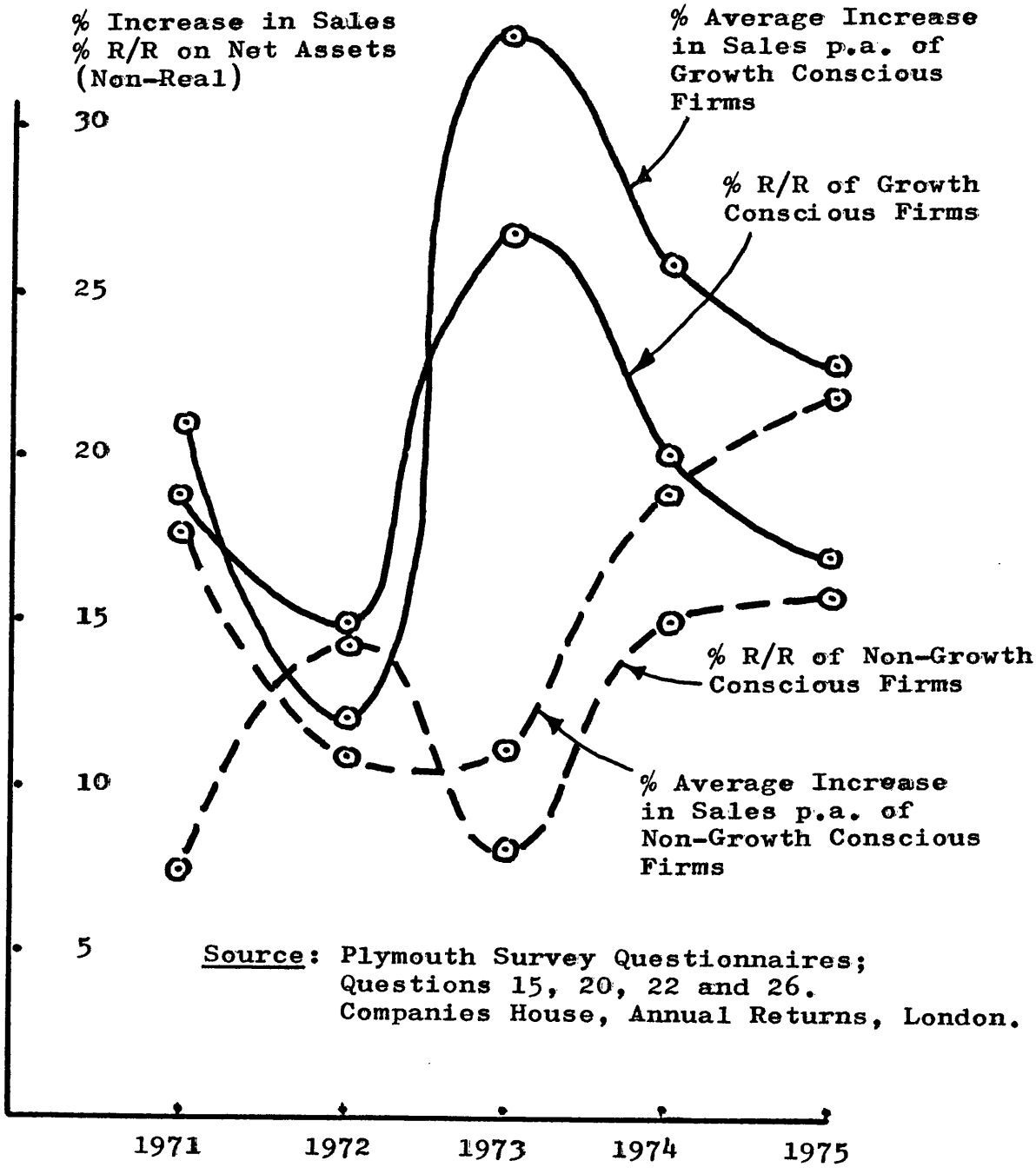
Table 9.33 Covariance, Standard Deviations, and Coefficient of Correlation for Average Growth of Sales and Average Rates of Return (Non-Real) on Net assets 1970-75. Plymouth Survey Full Sample.

Covariance	Standard Deviation of Average Annual % Growth of Sales	Standard Deviation of Average Rate of Return on Net Assets	Coefficient of Correlation = r	r^2
179.82	20.18	21.12	+ 0.435	0.189

Source: Plymouth Survey Questionnaires;
Questions 15, 20, 22 and 26.
Companies House, Annual Returns, London.

A graphical presentation of the comparison of the annual average % increases in sales and the average % returns on net assets for the Plymouth Survey over the period 1970-75 is now shown in Figure 9.29.

Fig 9.29 Comparison of Annual Average % Increases in Sales and Average % Rates of Return (Non-Real) on Net Assets 1970-75. Growth Conscious and Non-Growth Conscious Firms. Plymouth Survey Full Sample.



Source: Plymouth Survey Questionnaires; Questions 15, 20, 22 and 26.
Companies House, Annual Returns, London.

COMMENT The positive correlation between the rate of sales growth per annum and the rate of return on investment, as hypothesised by the findings of the 38 firm sample in Chapter 8, is confirmed at + 0.435. Similarly, the figures for both the 38 firm sample (1972-74) and the full sample (1970-75) tend to emphasise the profitability which can accrue from a well planned and implemented output/sales growth policy.

SUMMARY

CAPSULE I - INVESTMENT INCONSISTENCY Sustained investment programmes were certainly not in evidence over the 1970-75 period, and indeed, the four sizes of firm showed notable inconsistencies.

CAPSULE II - INVESTMENT AND THE ECONOMIC CLIMATE It would appear that favourable economic conditions and increased real investment by the Plymouth Survey firms were not positively correlated.

CAPSULE III - INVESTMENT AND PAST PROFIT A marked affiliation between real profit$_{t-1}$ and real investment$_t$ is apparent, and hints, for example, that any government measure which increases post-tax profit will, in turn, stimulate investment. In this respect the introduction of the 42% tax rate for eligible companies could be effective, along with stock relief provisions.

CAPSULE IV - INVESTMENT INDICATORS Lon term investment planning appeared to be nominal, and historical data formed the basis for most forward capital expenditure decisions. Surprisingly, the correlation between the historical rate

of return and real investment was inclined to be negative rather than the more popularly supposed opposite.

CAPSULE V - INVESTMENT FUNDS The majority of the firms were very much against external finance, and the overall investment_t / profit_{t-1} ratio of 0.68 (post-tax ratio = 1.41) would be explained more in terms of bank rather than institutional facility.

CAPSULE VI - INVESTMENT AND MONETARY POLICY The relationship between real M3 (taken as a reasonable indicator of monetary expansion) and real investment is negligible. During the period under review (1970-75) investment by the Plymouth sample firms appeared not to have been influenced positively by government monetary aspirations.

CAPSULE VII - INVESTMENT AND THE MINIMUM LENDING RATE The results are clearly inconclusive except that the effects of monetary policy aimed at the control of investment by the M.L.R. are unlikely to be reliable. And the relationship between the M.L.R. and real investment for all manufacturing industry is similarly obscure.

CAPSULE VIII - INVESTMENT RETURNS AND REGIONAL AID Bearing in mind a rather small sample, the thesis that regional aid firms produce better returns than non-regional aid companies, (over relevant and comparable periods), is confirmed.

CAPSULE IX - INVESTMENT APPRAISAL AND THE RATE OF RETURN ON NET ASSETS The findings probably suggest above all that further research would be advisable in order that the small sample of pro-D.C.F. firms might be increased and the period extended. On balance, considering the

verbal, documentary, and financial evidence it is almost certain that levels of investment and rates of return, even if acceptable, were inconsistent with the goal of optimality, fundamentally as a result of most firms being unfamiliar with the real techniques of investment appraisal.

CAPSULE X - INVESTMENT RETURNS AND THE USE OF MANAGEMENT TECHNIQUES The mean rate of return on net assets for the non-management techniques firms of 11.71% (9.01% real) was well below the 16.99% (13.12% real) for the remaining population. But the rather small sample of the latter and the difficulty in categorising the usage of techniques made definite conclusions difficult to reach.

CAPSULE XI - INVESTMENT AND OUTPUT PER UNIT OF LABOUR The findings of the Bolton Committee with regard to investment and output per unit of labour in small firms were very largely confirmed by the Plymouth Survey. Additionally, the labour intensive attitudes of the smaller units appeared to have contributed to sub-optimum outputs per unit of labour.

CAPSULE XII - TARGET AND ACTUAL RETURNS ON NET ASSETS Whilst several firms had exceeded their expectations, many had not reached their targets, others had failed to achieve even the minimum return required, and some had sustained losses in the period 1970-75.

CAPSULE XIII - RETURNS ON INVESTMENT AND SIZE OF FIRM When all returns are considered (i.e. when the deficits are included), or when the inter-quartile range data only are used, profitability and size of firm up to 200 employees are unrelated. But when the negative returns are

excluded, the profitability trend declines with firm size. In these respects the U.K. and U.S.A. data outlined in Chapter 6 are principally substantiated. Moreover, absolute profit/labour ratios were higher for the 200+ firms but were downward in trend, whilst the opposite was the case for the 0-24 companies.

CAPSULE XIV - INVESTMENT PROFITABILITY The top 8 firms with the highest average rates of return over the period 1970-75 also recorded the highest investment/net assets and investment/labour ratios as a whole. At the other end of the scale, the 8 firms with the worst returns were operating on inferior investment/net assets and investment/labour ratios. Secondly, $profit_t$ and $investment_{t-1}$ are positively correlated. Well planned and sustained investment, whether measured by investment/net assets or investment/labour ratios appears to yield results.

CAPSULE XV - INVESTMENT PERFORMANCE AND MANAGEMENT CONSULTANCY A sample of 11 pro-management consultant firms out of 65 is probably too small to be meaningful, but Companies House data revealed that rates of return on net assets of these firms were superior to the non-management consultant companies.

CAPSULE XVI - INVESTMENT PERFORMANCE AND FULL COST PRICING An examination of the price initiators, i.e. those practising individual and flexible pricing geared to market forces, showed that they generally achieved their target rates of return between 1970-75, whist the degree of success for the firms employing rigid pricing methods was considerably lower.

CAPSULE XVII - INVESTMENT RETURNS AND PROFIT MARGINS It was confirmed that at least 61% of the sample could not have achieved the targets set by the firms themselves with the mark-ups employed. In short, for many firms the formula:- mark-up = target X $\frac{\text{net assets}}{\text{sales}}$ was unknown.

CAPSULE XVIII - INVESTMENT PERFORMANCE AND OUTPUT FLEXIBILITY Output rigidity would, on the evidence available, appear to erode the possibilities of optimum investment performance.

CAPSULE XIX - INVESTMENT PERFORMANCE AND EXCESS CAPACITY Whilst the correlation of -o.248 between excess capacity and returns on investment could not be regarded as highly significant, it did indicate that prolonged unused capacity of around 16% and over became a variable which adversely affected returns.

CAPSULE XX - INVESTMENT PERFORMANCE AND OUTPUT GROWTH A positive correlation between the rate of sales growth per annum and the rate of return on investment of +0.435 tended to emphasise the profitability which can accrue from a well planned and implemented output/sales growth policy.

CHAPTER 10
SOME CONCLUSIONS

CHAPTER 10
SOME CONCLUSIONS

PREVIOUS SURVEYS Prior to the appointment of the Bolton Committee there had never been a comprehensive study, official or otherwise, of the small firm sector in the U.K. This important area is still relatively little researched, and the formulation of industrial policy has inevitably proceeded without adequate knowledge of the functions performed by small firms, of their efficiency, and of the likely effects upon them of the actions of governments. Indeed, studies of small firm investment decision making in the regions, e.g. the South West, have been negligible. Consequently, this work has proceeded in order that such a gap might be filled, or at least, provide ideas and material for deeper research. (Chapter 1).

PREVIOUS THEORIES Contributors have, of course, forwarded a host of theories of the firm covering such areas as profit maximisation, X-inefficiency, utility maximisation, sales revenue maximisation subject to a profit constraint, asset growth, output maximisation, long run survival, liquidity versus profitability trade-off, stability, full-cost pricing, uncertainty, behavioural theory, and not least, satisficing. One objective of this thesis was to identify, if possible, the most relevant of the above theories, and although the bulk of the material in respect of the

the Plymouth Survey concerns "investment practice" it would appear reasonable to conclude from the evidence that satisficing only, is the most likely pursuable goal for small firms. (Chapter 1).

MANAGERIAL EXPERTISE Essentially, managerial expertise, techniques employed, and attitudes displayed by the Plymouth Survey firms could hardly have produced other than satisficing profits. And, incidentally, a study of managerial decision making undertaken by the writer in the Greater Manchester area during 1971 indicated also that managerial skill in the purest sense was not of high quality. (Chapter 1).

SUB-OPTIMISATION This state of affairs embracing non-strategic investment decision making meant that levels of capital expenditure and rates of return in the smaller concern, tended to be sub-optimum, i.e. below that point at which any condition was the most favourable, or below that level of investment and below that rate of return which was reasonably attainable. These conclusions are based upon the sum total findings involving the selection of the Plymouth sample; the investment decision; investment finance; investment appraisal; investment performance by rate of return criterion; investment performance and pricing behaviour; investment performance and output determination; and investment accounting relationships derived from Companies House data. (Chapter 1).

THE PLYMOUTH SAMPLE The Bolton Committee pointed out that the small firm sector was extremely large and heterogeneous. By any standard small firms accounted for, numerically, the vast majority of all business enterprises. Small firms were, indeed, present in virtually every industry.

There was also extreme variation within the sector as regards efficiency, methods of operation, the nature of the market served, and the size of the resources employed. Faced with these facts it was obvious at the outset that the selection of representative small firms for investigation might be difficult. However, for the purposes of the Plymouth Survey, 56 small firms in manufacturing industry employing up to 200 employees plus an additional sample of 9 firms with over 200 staff were selected. The sample had to be representative and eight tests were devised to ensure this. The Plymouth sample finally complied with:-

(i) the distribution of manufacturing industry firms in the wider Plymouth area;
(ii) the distribution of the Plymouth area labour force;
(iii) a parabolic total distribution of firms by degree of production run "A", "B", "C", and "D";
(iv) a hyperbolic total distribution of firms by 0-24, 25-99, 100-199, and 200+ employee groupings;
(v) a parabolic industrial group distribution of firms by degree of production run;
(vi) a parabolic employee group distribution of firms by degree of production run;
(vii) an acceptable employee group distribution of the eight Standard Industrial Classification groupings as employed by the Bolton Committee; and
(viii) an acceptable age of firm distribution.
(Chapter 2).

COLLECTION OF DATA Several firms found the questionnaire rather searching and could not always give in-depth answers. Many firms gave information which they obviously believed to be correct, and this data had to be accepted as such. Documentary evidence was not always to hand. Firms just

did not keep certain records or have documents available. And even if they were available, retention was not always permitted. But some material was collected and used. As far as the answers to questions were concerned, it was usually possible to cross check most of the data either with other key personnel or against other answers. Indeed, the questionnaire was specifically designed to serve the dual purpose of collecting information and at the same time checking and stabilising conflicting evidence. Moreover the Greater Manchester Study undertaken by the writer in 1971 was employed to supplement the Plymouth Survey findings where appropriate. (Chapter 2).

KEY PERSONNEL It was assumed at the outset that in most small firms, and perhaps even in some large ones, the major decisions would be taken, or at least influenced, by one dominant key person. Inevitably co-directors and executives, e.g. accountants, would be consulted but the key person would nevertheless be instrumental in basic decision making. Where possible this individual was the officer who supplied the required data for the Plymouth Survey. It soon emerged that although these key personnel appeared to be relatively adequate for their decision making roles, very few were highly qualified academically. To what extent the quality of decision making was affected by academic qualifications was difficult to assess, but there was no apparent evidence to suggest that in the small firm qualified or unqualified managers had the expertise to pursue goals other than that of satisficing. It was notable that these observations did not wholly conflict with the writer's experience in small firms; with aspects of the Greater Manchester Study; and with the Bolton Report itself. (Chapter 2).

PRODUCTS AND PRODUCTION Firms had concentrated on their main products over the years for various reasons, but "tradition" as opposed to "strategy" was a principal explanation. Hardly any firms had considered movement into new fields, and even diversification was not popular. If diversification was practised it, perhaps surprisingly, tended to be undertaken by the smaller firms in employee groupings 0-24 and 25-99. The impression was that diversification could have been at least as beneficial as the activity currently engaged in which was producing disappointing results. As previously pointed out, firms were allocated a category "A", "B", "C", or "D" according to the degree of production run possible on their main activity. Interestingly, firms in categories "A" and "B" envied the longer production runs of categories "C" and "D" who countered by pointing out that "economies of scale" could be synonymous with lack of innovation and labour monotony. In any event it seemed likely that certain firms' production run limitations involved them in expense and inconvenience which could possibly have been eased by the pursuance of some relieving policy such as, for example, diversification, or market seeking. (Chapter 2).

PHILOSOPHIES OF OPERATION It emerged that the principal goal of 38% of the firms was satisfactory profit, and this claim was spread fairly evenly among the four employee groups. Subsidiary policies tended to be rather more individual, e.g. safety, but three clear aims predominated, namely: survival; satisfactory profits (again); and cost minimisation. Key personnel gave specific reasons for adopting their policies. Several claimed that satisfactory profit and survival were the only real goals for small firms, especially during recessionary conditions. However, policies did seem to be the result of historical or trad-

itional decision making, and once a firm had selected a goal this would be retained and only emended when events dictated. Flexibility of policy was not apparent. From this, it seemed clear that a flexible policy could well have increased profit, because if profit was not increased, then the policy could easily have been changed. Since firms considered survival either second to satisfactory profits in the hierarchy of objectives, or as one of the foundations for profitability, the signs were, again, that firms were satisficing in the Simon tradition. (Chapter 2).

INVESTMENT DECISION STRATEGY Firms generally agreed that if returns on investment were to be optimised, then the application of a specific investment strategy would be necessary. Profit optimality demanded a conscious effort on the part of the decision maker and this would require, among a whole range of techniques and goals, a well defined and implemented investment programme. For example, the emphasis should have been upon vertical investment, but 70% of capital expenditure had been basically horizontal. Moreover, even piecemeal investment had tended to be precipitated by crises. There was little evidence of positive investment thinking, and very few of the smaller firms admitted to planning ahead beyond 12 months, and the majority merely invested when the need arose. In short, most investment appeared to be non-strategic, piecemeal, non-anticipatory, and geared to survival profit. (Chapters 3 and 9).

INVESTMENT AND THE ECONOMIC CLIMATE Whilst there could be little doubt that a recessionary economic situation affected the decision to invest, it was equally clear that other, and perhaps more basic, factors were relevant.

For instance, between 1970 and 1972, which might be regarded as broadly expansionary, the all manufacturing industry investment index actually fell from 100 to 81. On the other hand, during the recessionary conditions which followed, the index moved from 87 in 1973 to 85 in 1975 after touching 98 in 1974. As far as the Plymouth Survey was concerned the average level of real investment also declined between 1971 and 1973, but from 1973 onwards real investment actually increased. At best, the relationship between investment and the economic climate must be regarded as tenuous. The impression was that investment by many of the firms would have been sub-optimum irrespective of the economic climate, and in most cases individual investment problems could have been tackled more by resolute management than by arbitrary economic upturns. (Chapters 3 and 9).

INVESTMENT FLEXIBILITY AND PROFIT$_{t-1}$ One test of investment efficiency might be the response of capital spending to some important short term development. It seemed worthwhile to examine short run investment behaviour as opposed to capital spending which had been determined largely by longer term and traditional policies in order to test optimality. Whilst many firms could indicate links between labour, output, assets, profit, costs, etc., and investment itself, there was little or no evidence to support these relationships over the short run, despite profit potential. The flexibility normally associated with small firms certainly did not apply to short term capital expenditure and, indeed, the lost opportunities could have been considerable. However, a marked affiliation between real profit$_{t-1}$ and real investment$_t$ was apparent with a correlation coefficient of 0.69. This hints, for example, that any government measure which increases

post-tax profit for the smaller firm will, in turn, stimulate investment. At the time of writing (1976) the effects of the reduction in corporation tax from 52% to 42% for concerns with no associated companies and with profit under £30,000, and the introduction of a variable rate for firms with profits between £30,000 and £50,000 (Finance Bill 1976, cl. 24) is unknown, but in this respect the evidence above could be encouraging. Incidentally, the provisions of the 1976 Finance Bill for taxation at 42% (£30,000 profit) and 52% (£50,000 profit) for small firms has been subject to improved revision. As at July 1977 the position is that profits less than £40,000 will be taxed at 42%, whilst profits over £65,000 will be liable for 52%. Profits between £40,000 and £65,000 are to be taxed at an increasing rate. There is also, of course, the opportunity for small firms to minimise their tax burden by maximising the closing stock figure in the balance sheet. If these provisions work effectively, then the impact on investment could, indeed, be favourable (Chapter 9; Capsule III) especially since the average levels of actual profit for the Plymouth Survey firms with fewer than 200 employees were as follows:- 1970 £12,486 (£12,486 real); 1971 £19,271 (£17,053 real); 1972 £17,570 (£14,520 real); 1973 £25,370 (£19,219 real); 1974 £27,937 (£18,140 real); and 1975 £44,644 (£23,373 real). (Chapters 3 and 9).

ACTIVE AND PASSIVE INVESTMENT Having established a relationship between investment and past profit, it would perhaps be misleading to assume that capital spending was determined by this factor alone. There were, of course, instances where investment had been undertaken for reasons other than profit availability. But was this investment active or passive? Was it visionary or merely replacement

investment? Was it positive or had it simply been imposed by a crisis? We have already noted that the "necessity criterion" was an important investment variable, and recent capital expenditure by 71% of the firms in the Plymouth sample had, in fact, been largely passive. It was also clear that the very small firms were far more guilty of this approach than the larger units. Even so, only 50% of these larger companies could claim to have been engaged in active capital spending. Whilst firm conclusions are difficult to reach, the general impression was that investment optimality was falling short if only 29% of the firms had been engaged in visionary investment. And, of course, there was no guarantee that even these firms would invest positively over the longer period. (Chapters 3 and 9).

INVESTMENT INDICATORS Long term investment planning would appear to be essential if optimality is to be achieved. Yet very few firms used likely future indicators as specific influences on their investment decisions. Some 62% of the sample felt that no reliable indicators existed apart from historical data, and only 3% for example, inverted investment with labour. Additionally, the correlation between the historical rate of return and real investment was, in fact, inclined to be negative rather than the more popularly supposed opposite. In other words, capital spending was likely to proceed even if the yield was below target provided that the investment item was actually needed, and that own funds were available, or the cost of borrowing was not prohibitive, in which case the investment could be postponed. This hardly suggested the pursuit of investment optimisation. The impression was that investment was inspired mainly by necessity which rendered capital spending imperative. Long term investment planning

was nominal, and the contribution such a policy could have made towards investment optimality was equally limited. (Chapters 3 and 9).

SOURCES OF FINANCE FOR INVESTMENT In the Plymouth Survey, the majority of the firms had used banking facilities for investment purposes only when their own, or private funds, had been inadequate. Some firms had obtained funds from the parent company or group, but whether this had, in turn, been provided externally was difficult to establish. It seemed reasonably apparent that a large part of the firms' long term finances for investment had been provided by owners' capital, profits, and private loans, with bank support a seemingly rising influence with the size of firm. Without doubt, firms preferred to use their own funds for investment purposes and, indeed, some companies were emphatic about rejecting excessive credit even if potentially profitable. Moreover, there was no shortage of external finance but it was very soon in evidence that the Plymouth Survey firms did not, in the main, resort to these funds. In fact, the impression was that institutional finance was to be avoided, and an outstanding feature of the evidence was that 95% of the sample had not been concerned in any attempt to obtain finance through facilities beyond the local bank or other subsidiary source. Several companies actually outlined opportunities for expansion and improvement, but still preferred the status quo. Some visionary investment via the institutions could well have taken advantage of the very opportunities identified by the firms themselves. There is no doubt that the institutions ensure that a venture is profitable before funds are made available, and thus one might infer that profits were being lost by firms' refusals to resort to these funds. In other words, firms appeared to

be content with an investment finance situation that could conceivably have contributed to sub-optimum investment levels and sub-optimum investment returns. (Chapters 4 and 9).

INFLUENCE OF GOVERNMENT A survey of Britain's larger companies implied that government initiative was imperative for an investment recovery, but the small firms in the Plymouth sample tended to temper this view in relation to their size. Investment decisions were considered to be less influenced by government intervention in the smallest units, whilst the larger firms were the ones who gave somewhat higher priority of concern to the government's alleged contribution to the "lack of confidence" thesis. Excessively high corporation tax figured prominently as an influence on investment finance decisions in that likely funds were being taxed away unnecessarily. An interesting aspect of the findings was that 8% of the sample believed that governments practised anti-small firm policies. But what exactly did small firms expect from governments? An ambivalent attitude could be discerned in that on the one hand firms had repeatedly valued their independent decision making capacity, whilst on the other they clearly expected some assistance from the authorities. A significant 54% of the sample reinforced the need for a restoration of confidence by the curbing of inflation, the abolition of price controls, and the reduction of corporation tax. A further 26% demanded the creation of "industrial stability" by the government. But only 8% called for an improved regional aid programme. Thus, we may observe that small firms' investment was more likely to respond to government action which impacted directly on profitability rather than to policy which produced indirect, delayed, or unidentified financial assistance. (Ch.4)

INVESTMENT AND CREDIT CONTROL POLICY The period 1970-75 was an interesting one in research terms for it contained wide degrees of government credit control. In 1970 the original monetary policy rules were in force, including "stop-go". By the end of 1971 the rules were reversed and credit availability via the "Competition and Credit Control" policy was in operation and expansion continued throughout 1972. However, a tightening up of the system could be discerned during 1973. The beginnings of a return to the old controls emerged during 1974 and by early 1975 the full circle was virtually complete. Thus, the Plymouth Survey firms had experienced both control and market freedom, not to mention uncertainty, during the period under review. But the findings showed that credit availability had had little or no effect on 60% of the sample, and where some influence was discernible in 40% of the population this had occurred only under special conditions. If finance were made available then this in itself would be no determinant of investment, and thus the picture indicated that if governments wished to stimulate investment in small firms then the implementation of various credit policies should, on the face of it, be awarded low priority. Firms had simply invested as required and had not taken advantage of easy credit facilities when available. Moreover, in support of this, assuming that the real money supply (M3) was both a reasonable indication of monetary expansion and the growth of funds hopefully intended for capital expenditure, the relationship between M3 and Plymouth Survey investment was negligible. However, if a two year time lag was introduced, which could be regarded as somewhat excessive, then the correlation was more pronounced during the expansion period, but doubtful over the M3 contraction. In general terms then, during the period 1970-75, investment by the

Plymouth sample firms appeared not to have been influenced unduly by government credit control aspirations. (Chapters 4 and 9).

INVESTMENT AND THE MINIMUM LENDING RATE To establish the level of investment which will actually occur we must examine the decisions of individual firms. In theory, a business unit will normally expand its investment so long as the expected rate of return from an additional unit of capital expenditure, i.e. the marginal efficiency of capital, is greater than the cost of purchasing the additional unit. But how relevant was this theory in reality? Would a persistently low rate of interest, for example, actually stimulate investment in small firms? The responses indicated that a rising M.L.R. would appear to reduce capital expenditure more than a falling cost of borrowing would increase it owing to the virtual zero elasticity of the M.E.C. schedule at high rates downwards. Some 33% of the sample felt that the M.L.R. had negligible impact on investment decisions generally, and a further 17% considered that the relationship between the M.L.R. and investment was indeterminate at best. However, it was possible to observe isolated instances when investment might be responsive, i.e. interest elastic, to changes in the rate of interest: (i) a capital project might have yields which stretched far into the future; (ii) a firm might already be working to tight margins, and there was not the scope for increasing prices through market imperfections; (iii) a shortage of internal funds might necessitate greater reliance on external borrowing; and (iv) interest charges on stocks might represent a higher percentage of total cost in certain small firms. But certainly the investment behaviour of the Plymouth firms with regard to the M.L.R. appeared to be somewhat involved and

unpredictable, and one could only infer that monetary policy involving nominal changes in the M.L.R. to influence investment had not enjoyed, and was unlikely to enjoy, notable measures of success. (Chapters 4 and 9).

REGIONAL AID Since 1970 and particularly since 1972 investment incentives relevant to the wider Plymouth area had been available and improved. Yet only 9% of the sample (6 firms) the very small ones least of all, could claim that investment incentives of all kinds had had any influence on their capital expenditure decisions. And although 31% of the firms said that their investment plans could be encouraged by regional aid, they nevertheless, regarded this influence as marginal. The investment decisions of 60% of the sample, with the smaller units again predominating, had clearly not been influenced in any way by government investment incentives. The majority of the Plymouth Survey firms were obviously only interested in regional aid when it actually coincided with their own plans for investment. If firms were investment optimising then presumably they would be aid optimising also, but this was clearly not the case. As a consequence, it was hardly likely that the companies in question were optimising their investment returns as far as regional aid was concerned. Indeed, the distinction between rates of return on investment of regional aid and non-regional aid firms was dramatic, the mean for the former being 29.65% (22.70% real) and 14.48% (11.14% real) for the latter. However, a sample of just 6 regional aid firms is really too small to be effective. Nevertheless, it was clear that small firms were not benefiting from regional aid as intended. Perhaps the system could be changed? For example, abolish all forms of grants, loans, and capital allowances against tax. Change corporation tax from a tax

on profit to a tax on value added. Thus, companies with good profits would pay less tax than currently, and those with persistently low profits would actually pay more. This tax could be used as an instrument of government policy by having different rates of tax for different regions, industries, and sizes of firm. The system would be cheaper to operate than the present procedure. And since the Plymouth Survey firms claimed (and substantiated in Chapter 9) that investment depended basically on profit, it would hopefully stimulate capital spending in small businesses upon realisation that the more profit they made, the less tax they would pay. (Chapters 4 and 9).

INVESTMENT APPRAISAL METHODS The Plymouth Survey data indicated that the payback and rate of return methods were by far the most popular used. And the consolidated schedule of main methods confirmed that 68% employed these traditional approaches; 17% used D.C.F; and 15% used trial and error methods or none at all. Firms which did actually use some method of investment appraisal were not always clear how or why the technique had been selected or adopted in the first instance, and 59% simply claimed their method to be of "traditional origin". Practically no firm had been influenced by the literature on the subject. Nearly 60% of the population using traditional techniques admitted to no major amendents to their methods and this response was fairly evenly spread among the four sizes of firm. But if D.C.F. was under consideration for adoption it tended to be in the larger units. In general terms, the firms in question did not present an encouraging picture in respect of the selection, employment, flexibility of approach, and potential improvement of the investment appraisal method. (Chapter 5).

INVESTMENT APPRAISAL CALCULATIONS A major problem arose whenever the phrases "cost of capital" or "discount rate" were used. Essentially, the cost of capital was difficult to define, and as far as the Plymouth Survey firms were concerned, this had to be taken as that which individual companies either "calculated" or simply that which they believed the cost to be. It was suspected at the hypothesis stage that small firms did not employ rigorous investment appraisal techniques or calculations. But it had to be noted that the yield, however calculated, was not always a crucial factor, e.g. when the necessity criterion applied. It is probably fair to state that where firms did adopt trial and error methods, these could have been suitable and adequate for the purpose intended. But this is not to say, of course, that such an approach would be wise over the longer term. Some 55% of the respondents pointed out that their estimated net returns were simply based upon a loosely defined miscellaneous savings criterion, and advanced forecasting of cash flows was certainly not in evidence. Moreover, the firms employing either net present value or the internal rate of return were unfamiliar with simple modifications which could serve to eliminate certain weaknesses inherent in these two methods. It seemed rather more than probable that firms could be sub-optimising their investments and returns as a consequence of their inability or even refusal to employ a more sophisticated mathematical approach to their calculations. (Chapter 5).

INVESTMENT APPRAISAL RETURNS In the Plymouth Survey the firms' attitudes tended to fall into two camps: firms predominantly using the traditional methods believed that the quality of the investment decision was not influenced by the quality of the investment appraisal method, whilst

firms employing modern techniques conceded, with certain reservations, that the quality of the method could enhance the quality of the decision and return. The accounting data from Companies House, London, suggested above all, that further research would be advisable in order that the small sample of pro-D.C.F. firms might be increased and the period under review extended. Even so, it was perceptible that between 1970 and 1972 the rates of return on net assets of the firms employing D.C.F. exceeded those of the non-D.C.F. companies. However, from 1972 the overall performances of the traditionalist firms were superior. It could be the case, of course, that the accelerating inflation from 1972 onwards might have affected the anticipated longer term discounted cash flows more adversely than shorter term payback calculations. On balance, considering the verbal, documentary, and financial evidence, it was almost certain that levels of investment and rates of return, even if acceptable, were inconsistent with the goal of optimality, fundamentally as a result of most firms being unfamiliar with the real techniques of investment appraisal. (Chapter 9).

MANAGEMENT TECHNIQUES The respondents were asked to indicate the most important management techniques employed including investment appraisal. Budgeting in its widest sense appeared to be the most popular, but 12% of the firms could not indicate a major operations research method at all, and no firm recorded investment appraisal as a major management aid. Interestingly, some correlation between a British Institute of Management Survey and these findings could not be ruled out. However, two main problems were apparent. On the one hand it was not easy to categorise specifically the firms who were employing some management techniques, and those who were clearly

using none at all. Every firm could show to varying degrees that certain systems were in operation, but 8 of the smaller units did not appear to be well advanced even in basic systems, and actually said so. Admittedly, in certain instances the introduction of sophisticated operations research tecniques would be fairly difficult, if not impossible. Nevertheless, the mean rate of return on net assets for the non-management techniques firms of 11.71% (9.01% real) was well below the 16.99% (13.12% real) for the remaining population. Unfortunately, the second problem is whether a sample of only 8 non-management techniques firms is sufficient to give meaning to these figures. Incidentally, two of these firms had failed to provide Companies House with up-to-date returns. In the end it is perhaps permissible to ask the reader to draw his own conclusions. (Chapters 5 and 9).

ACTUAL INVESTMENT APPRAISAL CALCULATIONS The firms employing the traditional methods generally presented incomplete and inadequate appraisals. On the other hand, the companies using D.C.F. produced much better evaluations, but even so, were not immune from criticism. Overall, the investment appraisals and investment strategies practised were, again, at odds with the goal of optimisation. For example, the most popular combination of factors taken into account was depreciation, taxation, and investment incentives. Even so, only 32% of the sample acknowledged these and the inclusions were rather more pronounced in the larger units. Surprisingly, only 10% felt the need to make adjustments for inflation. And a point of some interest was that no firm felt that such items as risk, uncertainty, obsolescence, and opportunity cost could be mathematically catered for. Undoubtedly, the approach to the method and the variables to be included inclined

far more towards the trial and error than the mathematical. Whether or not some factors were self-correcting, self-cancelling, or simply non-measurable, remained arguable, but in any event, would be no substitute for rigour. Similarly, although certain types of investment could indeed overshadow the calculations, and final accounts could automatically reflect net returns long term, this tended simply to confirm the rule of thumb attitude rather than to defend it. (Chapter 5).

RATES OF RETURN ON INVESTMENT The severe difficulties in actually measuring a company's performance or efficiency were acknowledged at the outset, but since the majority of the Plymouth Survey firms expressed their profitability in terms of a "rate of return on net assets" this particular criterion was adopted. It was soon evident that policies of rigid targeting, which exemplified a behavioural pattern closely allied to satisficing, were generally employed by the sample firms. Moreover, the minimum acceptable rate of return tended to be determined by specific circumstances or events, and any apparent flexibility was directed more torwards horizontal rather than vertical investment. Companies House data revealed that whilst several firms had exceeded their expectations, many had not reached their targets, others had failed to achieve even the minimum, and some had sustained losses. In total, some 61% of the sample actually failed to reach the targets set by the firms themselves, on an average basis, over the period 1970-75. Reasons for this high failure rate were not too difficult to identify for the sample as a whole, and several have already been presented in foregoing chapters. But other possibilities could be found within the Bolton Report. For example, the findings of the Bolton Committee with regard to investment and output

per unit of labour in small firms were investigated and confirmed by the Plymouth data. The average real investment/labour ratios tended to increase with the size of firm, and the average real output/labour ratios behaved similarly. In these respects the labour intensive attitudes of the smaller units appeared to have contributed to sub-optimum outputs per unit of labour, and indirectly, to sub-optimum returns on investment. Perhaps significantly, the major reason given by the firms for the failure to reach target returns on net assets was "uncontrollable external factors", and only 17% considered that their own inadequate investment strategies, expertise, and appraisals, might have caused financial performance to be below par. (Chapter 6 and 9).

INVESTMENT PROFITABILITY AND SIZE OF FIRM In almost every case examined the published U.K. and U.S.A. evidence indicated that when deficit companies were included then profitability and size of firm were independent. When positive income companies only were considered then a weak inverse relationship between size and profitability was observable. In all cases, however, the variability of profits was higher in the smaller size classes than the larger. Importantly, these U.K. and U.S.A. research findings were principally substantiated by the Plymouth data. Also, official figures for the U.K. showed a disappointing picture of investment for manufacturing industry as a whole over the period 1970-75. At no stage had capital expenditure exceeded that for 1970 in real terms. And in fact, only 21% of the Plymouth Survey sample, for example, had considered the issues sufficiently to reach the conclusion that a more positive investment strategy was required. Well planned and sustained investment whether measured by the investment/net assets or invest-

ment/labour ratios appeared to yield results, and the firms acknowledged this. But too many small firms were clearly not adopting this approach and, in turn, were not producing even target performances. But even more striking was the finding that no Plymouth firm could guarantee that any suggestion put forward to actually improve returns would, in fact, be implemented. (Chapters 6 and 9)

INVESTMENT PERFORMANCE AND MANAGEMENT CONSULTANCY A highly significant 69% of the Plymouth Survey firms had neither employed, nor had considered employing, outside expertise, believing consultants to be unnecessary, over-rated, expensive, inventors of problems, disruptive, and representative of external interference. But a Department of Industry survey showed that of the firms in their sample, 95% were satisfied or partially satisfied with the consultants employed; 93% claimed that they had used, or would use, them again; and the net benefits were estimated by the firms themselves to be about 200% on the consultancy fees in the first year alone. Moreover, Companies House data revealed that the rates of return on net assets of pro-management consultant Plymouth Survey firms were superior to the non-management consultant companies. On the evidence available, it did appear that management consultancy had manifested itself in the form of improved returns in much the same way as reported by the Department of Industry survey. Consequently, it seemed reasonable to conclude that the Plymouth Survey firms' strong reservation about consultancy were very much over-stated, and outside expertise could well have aided the pursuit of investment optimality. (Chapters 6 and 9).

PRICE DETERMINANTS The published literature did not provide much data on how small firms actually priced in practice. Evidence that was available on pricing behaviour was somewhat inadequate and, not least, inconsistent. This was perhaps not too surprising in view of the continued popularlity of the use of traditional models of the firm, for example, which postulated that price was based upon the equating of marginal cost with marginal revenue. As far as the Plymouth sample was concerned, 86% employed a cost based price (C+%) and this finding was evenly spread over all four sizes of firm. No company fixed price by the MC=MR rule and only 14% could be described as "price initiators", i.e. employing flexible pricing in relation to rivalry, and what the market would pay at the relevant output level. Market conditions, profitability requirements, and technical problems of production, were considered to be important price influences (as opposed to determinants) by 80% of the firms, but occasional price amendments in response to these influences were not conducted in a conscious profit optimising manner. It could be argued, of course, that price leadership by certain large companies reduced many of the small firms in question to price takers. But some concerns, at least, could and should have employed a little more flexibility in their pricing if returns were to be optimised. For example, an examination of the eight main price initiators revealed that seven of them principally achieved their target rates of return on net assets, whilst the degree of success for the firms using rigid pricing methods was considerably lower. Similarly, of the firms able to handle one-off jobs, exactly 50% of them practised far more price flexibility on these contracts than they did for routine production. Although rigid C+% was adopted by the majority for routine work, flexibility was possible, was

practised, and was successful, but almost exclusively on one-off jobs. Since rigid pricing based entirely upon costs could not lead to maximum profits, the behaviour of the Plymouth firms was, indeed, analogous to the satisficing theory described by H. A. Simon giving rise to satisficing returns on investment only, and no more than that. (Chapters 7 and 9).

TARGET RETURNS AND MARK-UP RELATIONSHIP The target rate of return on net assets and the mark-up on costs are, of course, mathematically related by $MU = T \times \frac{NA}{S}$. But the Plymouth firms who, in the main, failed to reach their targets (over 60% of the sample) could hardly have done otherwise with the mark-ups employed. Even after allowing for adverse market conditions when losses were perhaps inevitable for some companies, it remained true that the majority were simply not co-ordinating the mark-up with the required target rate of return. In short, for many firms the above relationship was presumably unknown, and the evidence suggested that the problem lay more within the pricing rather than with the setting up of the target rate of return in the first instance. (Chapters 7 and 9).

COSTS OF PRODUCTION There was little doubt that empirical evidence in general, and that from the Plymouth Survey in particular, strongly supported the view that C+% was the most common method for the determination of prices in practice. But one drawback, among several, of this method rested on the assumption that firms actually knew what their costs of production were at given levels of output. In other words, this would imply a knowledge of the shape and position of the average cost curve. Unfortunately, there has been a long drawn out, and as yet

unresolved, dispute among economists as to the actual behaviour of firms' costs of production especially over the longer term. Traditionally the average cost curve has been assumed to be U-shaped, and whilst at one extreme certain economists have supported this in the belief that L-shaped curves were rarely if ever relevant, others have felt that such curves were typical of modern manufacturing industry. As for the Plymouth Survey, all firms appeared to be operating on an L-shaped average cost curve albeit of varying description. No U-shaped curves were apparent or, indeed, reported by the firms. In focussing attention upon costs, four basic L-shaped curves for four types of small firm, as categorised by degree of production run, were observed. And it did seem clear that these firms tended to use the L-shape more as a "price guide line" rather than rival prices, or what the market would actually pay. (Chapters 7 and 9).

MARKET DEMAND CURVES For optimality a firm needed to know, or at least be able to estimate, its market demand function for every time period throughout the product's life span. One of the most important tasks of managers concerned with pricing policy under conditions of imperfect knowledge was to assess the significance for the shape of the demand curve as a result of small changes in the value of the independent variables on which it depended. But the Plymouth evidence suggested that the above "sensitivity analysis" approach to demand was not practised. Firms simply fell back on rule of thumb pricing methods. However, the Plymouth interviewees were asked to estimate the likely shape of their demand curves for the main product, and four basic demand functions were identified for the four types of firm categorised by degree of production run. But an important finding, also

revealed by the firms themselves, was that the market demand curve possessed a perfectly inelastic section at the relevant output level. This indicated that the average revenue curve was roughly Z-shaped, a point seemingly absent from the literature. This meant that prices could be raised by varying, if small, amounts depending on the category of firm, without any fall in demand. Since firms tended not to take advantage of this, some revenue was lost, profits were lower than the attainable, and returns on net assets were inevitably below optimum. (Chapters 7 and 9).

OUTPUT DETERMINANTS In considering the goals of firms, revenue maximisation was certainly one of the most important of the alternatives to profit maximisation. In turn, an alternative to the maximisation of sales revenue was to maximise output volume, implying that firms chose that level of output where demand and average cost curves met. Whilst firms could not really be expected to pursue such a policy consistently in the real world, successful output fixing did require rather more thought than simply allocating fixed quotas of work. A certain flexibility was essential. But 48% of the Plymouth firms fixed output by allocating quotas which would be retained for some time until events dictated otherwise. Only 29% were scheduling output in response to market forces suggesting reasonable degrees of flexibility. But perhaps most striking was the 23% actually employing "constant output" policies. A confirmation of this lack of flexibility emerged in the form of the S-shaped supply curve which complemented the Z-shaped demand function. Both curves were thought to be unrecorded in the literature. Current and expected demand, as measured by length of order books, were fundamental determinants of output levels, whilst

labour availability and excess capacity acted as major influences. As far as output contraints were concerned, inadequate plant capacity predominated with rising costs of production a rather poor second. Results indicated that very rarely did firms raise or lower output in the short run in a conscious attempt to optimise sales, profits, or even costs. Yet accounting data highlighted superior profitability for the flexible output firms. Furthermore, of the 9 successful firms which employed flexible pricing, 8 were at the same time practising flexible output, which also resulted in superior returns on net assets. Therefore, on the evidence available, output rigidity appeared to have eroded optimum investment performance of some 71% (48% + 23%) of the sample firms. (Chapters 8 and 9).

INVESTMENT PERFORMANCE AND OUTPUT CAPACITY The average level of excess capacity for the 65 firm Plymouth sample was 16.21% over the period 1970-75 with some firms experiencing as much as 50% of unused resources on occasions. The majority of the companies were committed to some degree of subsidiary production but there was no evidence that this was specifically employed for the reduction of spare capacity. Yet if outputs had been raised to the 100% level then most of the firms would have suffered no financial hardship and most likely would have increased profits. Very few undertook market research, market seeking, or even advertising, despite persistent under-used resources. And although there was no apparent relationship between the level of excess capacity and the achievement (or otherwise) of target returns on net assets, there was a negative correlation of -0.248 between excess capacity and actual returns on net assets. Moreover, all the deficit companies had high levels of excess capacity.

Whilst the correlation could not be regarded as highly significant, it nevertheless indicated that prolonged unused capacity of around 16% and over became a variable which adversely affected returns on capital employed. Unfortunately, only 24.61% of the sample had excess capacities of 10% or less, a level considered to be barely acceptable by most respondents. Indeed, interviewees themselves further supported the view that the falling short of optimum returns could almost certainly have been eased by the application of some basic marketing skills impliedly lacking in their firms' persistent sub-optimum output levels. (Chapters 8 and 9).

INVESTMENT PERFORMANCE AND OUTPUT GROWTH In essence only 43% of the sample firms could be described as market growth conscious with an average increase in sales per annum of 23.73%. On the other hand, the non-growth conscious companies only recorded an average annual sales increase of 17.02%. Significantly, the former returned an average of 21.10% (16.54% real) on capital employed whilst the latter could only achieve 12.23% (9.10% real). Additionally, there was a positive correlation of 0.435 between the rate of sales growth per annum and the rate of return on investment. This clearly emphasised the returns which could accrue from a well planned and implemented output/sales growth policy but rather too many Plymouth firms seemed content not to pursue this avenue of profitability. (Chapters 8 and 9).

RECOMMENDATIONS - THE 12 POINT PLAN FOR INCREASED PROFIT
The findings of the Plymouth Survey have indicated certain relationships between superior returns on net assets and the priority accorded to 12 aspects of management:-

(i) Investment consistency;
(ii) Vertical investment;
(iii) Regional aid;
(iv) External funds;
(v) Discounted cash flow;
(vi) Management techniques;
(vii) Management consultancy;
(viii) Co-ordination of target returns on net assets and mark-up on costs;
(ix) Price flexibility;
(x) Low excess capacity;
(xi) Output flexibility;
(xii) Sales growth.

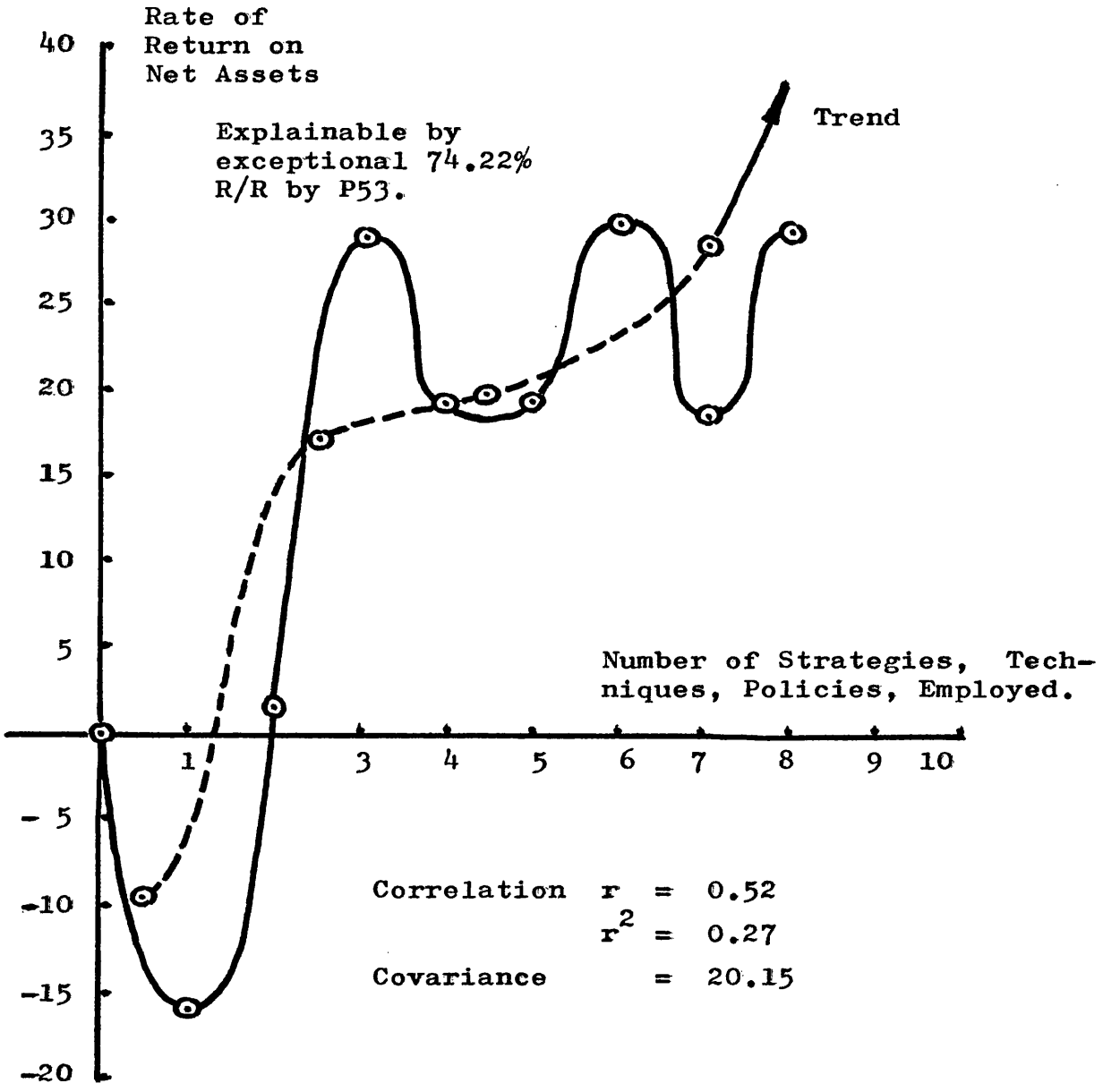
Table 10.1 below summarises the degree of employment of the 12 point plan by the Plymouth firms.

Table 10.1 Adoption Strategies, Techniques, Policies. Plymouth Survey Full Sample 1970-75.

Strategy, Techniques, Policy, i.e. the 12-Point Plan.	% Number of Firms Employing Strategy, Technique, or Policy.
Investment consistency	23%
Vertical investment	15%
Regional aid	9%
External finance	5%
Discounted cash flow	17%
Management techniques	88%
Management consultancy	17%
Price flexibility	14%
Co-ordination of target returns on net assets and mark-up on costs	37%
Low excess capacity	25%
Output flexibility	29%
Sales growth	43%

Source: Plymouth Survey Questionnaires; Questions 15, 21, 26, 39, 54, 61, 63, 70, 78, 79, 93 and 97. Companies House, Annual Returns, London.

Fig 10.1 Number of Strategies, Techniques, or Policies of the 12-Point Plan Employed and Rates of Return (Non-Real) on Net Assets. Plymouth Survey Full Sample 1970-75.



Source: Plymouth Survey Questionnaires; Questions 15, 21, 26, 54, 61, 63, 70, 78, 79, 93 and 97.
Companies House, Annual Returns, London.

Table 10.2 Number of Strategies, Techniques, or Policies of the 12-Point Plan Employed and the Rates of Return on Net Assets. Plymouth Survey Full Sample 1970-75.

Number of Strategies, Techniques, Policies Employed from 12 Point Plan	Average % Rate of Return on Net Assets (Non-Real)	Rate of Return Trend	Number of Firms Employing Aspects of 12 Point Plan	% Number of Firms Employing Aspects of 12 Point Plan
0	0.68	-9.87	3	4.6
1	-16.20		13	20.0
2	1.39	17.70	11	16.9
3	29.11		13	20.0
4	19.25	19.53	7	10.8
5	19.69		11	16.9
6	30.74	28.50	5	7.8
7	18.86		1	1.5
8	29.50		1	1.5

Source: Plymouth Survey Questionnaires; Questions 15, 21, 26, 39, 54, 61, 63, 70, 78, 79, 93 and 97. Companies House, Annual Returns, London.

Table 10.3 Most Successful Firms Employing 6, 7, or 8 Factors of the 12-Point Plan. Plymouth Survey Full Sample 1970-75.

Firm	Industry	Rate of Return on Net Assets (Non-Real)	Target Rate of Return	Result	Number of Factors Employed
P16	MME	27.78%	20%	Success	6
P19	MME	38.97%	25%	Success	6
P24	MME	44.68%	33%	Success	6
P32	MME	20.95%	20%	Success	6
P42	TLCF	21.36%	20%	Success	6
P62	OMG	18.86%	15%	Success	7
P55	OMG	29.05%	20%	Success	8

Source: Plymouth Survey Questionnaires; Questions 15, 21, 26, 54, 61, 63, 70, 78, 79, 93 and 97. Companies House, Annual Returns, London.

Table 10.4 Least Successful Firms Employing 0 or 1 Factor Only of the 12-Point Plan. Plymouth Survey Full Sample 1970-75.

Firm	Industry	Rate of Return on Net Assets (Non-Real)	Target Rate of Return	Result	Number of Factors Employed
P5	FDT	2.07%	20%	Fail	0
P7	FDT	2.70%	10%	Fail	0
P9	CAI	- 2.72%	20%	Fail	0
P17	MME	18.94%	20%	Fail	1
P27	MME	-14.26%	20%	Fail	1
P38	EE	-25.61%	20%	Fail	1
P48	OMG	- 2.56%	10%	Fail	1
P49	OMG	-57.54%	50%	Fail	1

Source: Plymouth Survey Questionnaires; Questions 15, 21, 26, 54, 61, 63, 70, 78, 79, 93 and 97.
Companies House, Annual Returns, London.

Despite any limitations which might be endemic within the sample, the overall picture could not be disregarded, especially with a positive correlation of 0.52 between the usage of the 12-point plan and returns on net assets. The results showed that the firms (10.8% of the sample) employing 6, 7, or 8 factors of the 12-point plan produced far superior returns than those companies (24.6% of the sample) that used 0 or 1 factor only. Whilst it cannot, of course, be suggested that small firms simply adopt the plan as a whole and then expect automatic improved profitability, it is recommended that companies examine aspects of the plan and implement those factors which might reasonably be employed.

JOHN BOLTON "INTERVIEW" In an exchange of views at the London Business School on 13th July 1977 John Bolton, Chairman of the 1971 Bolton Committee, said that it was regretable, but not altogether surprising, that the small

firm sector was still in decline. But since small companies were vital to the economy the case for their support by helpful government intervention was a strong one, to maintain reasonable levels of employment, to encourage innovation, and so on. Indeed, since the Bolton Report in 1971 there had been no fewer than 11 Acts of Parliament relating to the small firm sector. However, many basic problems remained. For example, ambitious propositions by small units to expand seemed to be rejected by the financial institutions in favour of cost and labour labour saving schemes. Whilst officially, small firms should pay little tax when closing stock values were maximised in the balance sheet in general terms the taxation system still tended to be penalistic. And the transfer of assets situation as a result of Capital Transfer Tax was equally contentious. Remarkably, whilst there was no shortage of courses and advice for small firms, e.g. Universities, Polytechnics, I.T.B's, C.O.S.I.R.A., etc., there was little or no real co-ordination of these activities. Nevertheless, despite these, and other, issues of concern, John Bolton agreed that small firms tended to be their own worst enemies for many of the reasons outlined in the foregoing chapters, and as summarised below.

FINALITIES Thus, it has been observed that for the Plymouth Survey firms the adoption of the main product was basically of traditional origin and changes in the product mix were extremely rare despite market movements. Diversification, too, was unpopular irrespective of the likely benefits. And survival or satisfactory profits only, emerged as fundamental goals. Investment strategies were somewhat negative or defensive even if apparent. There was no correlation between investment and the economic climate, and capital expenditure shortfalls could, and

should, have been tackled more by resolute management rather than by reliance on economic upturns. Additionally, the flexibility generally associated with small firms was not observable in respect of short run investment. Indeed, investment was principally passive, non-visionary, and horizontal. Long term indicators were not in evidence and longer term investment planning was minimal. In fact, investment was determined in the majority of cases by the "necessity criterion". Firms clearly preferred to use their own funds for investment purposes and external finance was generally avoided. Firms felt that if governments were to assist them in their investment aspirations, then direct aid was required. Perhaps not surprisingly, government monetary policy aimed at stimulating investment levels indirectly, had been largely ineffective. Nevertheless, although indirect regional aid contained certain anomalies, the pro-aid firms produced higher rates of return on net assets than the firms that had not taken advantage of this assistance. The phrases "cost of capital" and "discount rate" caused some confusion and in most cases these factors were simply "estimated". Firms were mainly ignorant of discounted cash flow and even pro-D.C.F. companies were unaware of certain mathematical pitfalls. Generally, there was a non-flexible approach to investment appraisal and methods had not been improved to any great extent over the years, or even revised. Calculations of cash flows were non-rigorous and in some cases, suspect. Furthermore, returns on net assets were superior in the firms employing "operations research" methods yet very few respondents were convinced of the benefits of certain management techniques, including D.C.F. Companies set themselves a return on investment target which tended to be rigidly applied. Significantly, just over 60% of the firms failed to reach

these targets on an average basis. The firms explained their failure to achieve the target in terms of "external factors" rather than from inadequacies within the unit itself. Hardly any firms had employed management consultants and were clearly prejudiced against them despite the absence of actual experience, and the fact that rates of return on net assets of the pro-management consultant firms were impressive both in the Plymouth Survey and in the literature. Pricing was based principally upon a rigid cost plus percentage (C+%) determinant and any flexibility depended upon circumstances rather than policy. Yet flexible pricing did produce superior rates of return. Curiously, few firms were aware of the relationship between target return on net assets and the mark-up on costs. In focussing attention upon costs, four basic L-shaped average cost curves for four types of small firm were observed. At the same time, four basic market demand curves were also identified, and a Z-shaped curve (apparently absent from the literature) emerged. Output levels were somewhat rigidly determined, and an S-shaped supply curve typified this inflexibility. In other words, output levels were hardly ever manipulated to achieve optimisation of overall performance despite the fact that flexible output policies produced higher rates of return than firms practising rigidity. Excess capacity averaged 17% for all firms over the period 1970-75, and although interviewees claimed that profits would be higher at zero excess capacity, very little positive action was taken to eliminate this wastage of resources. Ominously, a negative correlation between excess capacity and the rate of return on net assets was discernible. But remarkably, there was negligible market research, market seeking, or even advertising even though sales growth clearly paid dividends. Finally, Companies House data revealed that investment

levels were inconsistent and non-programmed. Importantly, a positive correlation between investment$_t$ and profit$_{t-1}$ was noted and a positive correlation between profit$_t$ and investment$_{t-1}$ similarly prevailed. There was also a significant correlation between returns on net assets and the extent of adoption of a 12-point plan aimed at increasing profitability. Unfortunately, the 12-point plan was not comprehensively employed by the sample firms. In short, the total evidence strongly and continually suggested that the sample firms' overall investment behaviour was, indeed, inconsistent with the goal of optimisation, and in this respect, one must conclude that the hypothesis was principally substantiated.

END

INVESTMENT BEHAVIOUR
THE PLYMOUTH SURVEY
QUESTIONNAIRE

---

(1) BASIC DATA

Name of officer completing questionnaire

Name and address of firm

Industry and nature of business

Company's main product and any subsidiary products, and why produced

Size of firm at year ending	1974	1973	1972	1971	1970
Employees	....	....	....	....	....
Sales	....	....	....	....	....
Net Assets	....	....	....	....	....
Pre-tax profit	....	....	....	....	....
Capital investment	....	....	....	....	....

Company's main policy

Subsidiary of (or) parent of

Date of formation

---

(2) INVESTMENT STRATEGY

What is the firm's overall capital investment strategy, e.g. tactics employed to achieve short and long run investment objectives?

---

(3) INVESTMENT DETERMINANTS AND INFLUENCES

Which factors determine or influence the decision to invest in new plant and machinery, e.g. length of order books, short run profit, rival investment, cost reduction, finance availability, etc?

Has government regional aid ever influenced your decisions to invest?

---

(4) INVESTMENT DECISIONS

Please give examples of some recent capital investment decisions, e.g. new machines purchased and for what purpose, e.g. to increase speed of production.

---

(5) INVESTMENT APPRAISAL AND CALCULATION

How are capital investment projects actually calculated for viability, e.g. by payback method, net present value, internal rate of return, etc?

---

(6) INVESTMENT APPRAISAL EXAMPLES

Please give some examples of actual investment calculations (copies if possible) and the decisions reached from the calculations.

---

(7) RATE OF RETURN ON INVESTMENT

What % rate of return (or payback) on capital investment is normally expected, or is there a minimum to maximum range?

---

(8) SOURCES OF FINANCE FOR INVESTMENT

What are the main sources of finance for capital investment, and have any external funds (other than local bank) ever been employed?

---

(9) OUTSIDE SPECIALIST INVESTMENT ADVICE

Has the firm ever used outside expertise e.g. management consultants, to assist with capital investment strategy, or calculations, or management techniques, and if not, why not?

---

(10) INVESTMENT PROBLEMS 1970-75

What are, or have been, the main investment problems of this firm and industry, and what could be done to make investment strategy easier to plan and implement?

THE INVESTMENT BEHAVIOUR OF THE SMALLER BUSINESS UNIT
THE PLYMOUTH SURVEY
QUESTIONNAIRE - EXTENDED

AIMS: To research smaller firms' (I) philosophies of operation; (II) accounting relationships; (III) investment decisions; (IV) investment finances; (V) investment appraisals; (VI) investment returns; (VII) investment returns via marketing; and (VIII) investment returns via production levels.

PHILOSOPHIES OF OPERATION----------

(1) Key person (interviewee). Employees

---

(2) Name and address of firm.

---

(3) Ltd. Co. parent, subsidiary, group, date of formation, etc.

---

(4) Industry (SIC) and nature of business.

---

(5) Main and subsidiary products.

---

(6) Why has the firm concentrated on these products?

---

(7) Is production mainly routine batch, one-off, etc?

---

(8) Why has the firm concentrated on this type of production?

---

(9) What are the problems of this type of production?

---

(10) What is the firm's main overall policy?

---

(11) What are the firm's subsidiary policies?

---

(12) To what extent have these policies been successful?

---

(13) Other relevant data, e.g. labour, exporting, etc.

Industry
Employees
Production Run Category

ACCOUNTING RELATIONSHIPS

Years	1975	1974	1973	1972	1971	1970
(14) Employees (L)						
(15) Sales (S)						
(16) Fixed Assets (FA)						
(17) Current Assets (CA)						
(18) Total Assets (TA)						
(19) Current Liabilities (CL)						
(20) Net Assets (NA)						
(21) Net Investment (I)						
(22) Pre-Tax Profit (P)						
(23) Costs of Production (C)						
(24) Man. Ind. Cap. Exp.	1820	2087	1864	1738	1991	2130
	85.4	97.9	87.5	81.5	93.4	100.0
(25) Inflation Index	191	153	132	121	113	100
(26) Pt = f(At) Pt/At						
(27) It = f(Pt-1)						
(28) Pt = f(It-1)						
(29) It = f(St-1)						
(30) St = f(It-1)						
(31) It/At						
(32) Pt/St Pt/Ct						
(33) St = f(At-1)						
(34) St/At						
(35) It/Lt						
(36) St/Lt						
(37) At/Lt						
(38) Pt/Lt						

COMPANIES HOUSE ANNUAL RETURNS

INVESTMENT DECISIONS

(39)	What is the company's overall investment strategy?
(40)	How was the decision to adopt this strategy reached?
(41)	To what extent has this investment strategy been successful?
(42)	What are the main investment problems of this firm?
(43)	What are the main investment problems of this industry?
(44)	Which factors actually determine the decision to invest?
(45)	To what extent is real investment related to manpower strength?
(46)	Indicate the relationship between real investment and real output.
(47)	Specify the link between real investment and the level of real assets.
(48)	To what extent is real investment influenced by real profit?
(49)	Is real investment influenced by changes in costs, taxation, etc?
(50)	Which factors merely influence the decision to invest?
(51)	Give actual examples of investment decisions reached in the recent past. Alternative projects?

(52) Which factors are the most important indicators in forming general investment expectations for the future?

INVESTMENT FINANCE

(53) To what extent does government policy affect your investment decisions?

(54) Specifically, to what extent are your investment decisions influenced by regional aid?

(55) Specifically, how do changes in the M.L.R. influence your investment decisions?

(56) Specifically, how do changes in credit availability influence your investment decisions?

(57) What could the government do to make investment easier for firms?

(58) What could the financial institutions do to make investment easier?

(59) Indicate your main sources of finance for investment.

(60) What difficulties, if any, are experienced in the raising of finance for investment?

(61) Give reasons, if applicable, for your not resorting to outside funds for investment.

INVESTMENT APPRAISAL

(62) How are investment projects actually calculated for viability? Alternatives?

(63) Are any of the following methods ever used:-
(a) payback
(b) ave. r/r on outlay
(c) ave. r/r on ave. outlay
(d) return on outlay
(e) return on ave. outlay
(f) net present value
(g) internal rate of return
(h) others?

(64) How are cash flows actually assessed?

(65) How has this method of investment appraisal and cash flow assessment been selected for use by the firm?

(66) Are any special factors e.g. tax, risk, etc., taken into account in calculations?

(67) How are these factors taken into account?

(68) Give examples of actual investment calculations.

(69) To what extent does the firm revise its methods of investment appraisal from time to time?

(70) Which major management techniques does the firm use generally?

INVESTMENT RETURNS

(71) What pre-tax % return is normally expected on investment?

(72) Is this % rigid or variable?

(73) What minimum pre-tax % return on investment is acceptable?

(74) Give reasons, if applicable, for failing to reach target rate of return on investment.

(75) Are expected rates of return on investment invariably lower than actual rates of return?

(76) What could the firm do to make investment more efficient?

(77) What could the firm do to raise investment returns on current investment?

(78) Has the firm ever employed outside expertise to assist with investment appraisal and investment decision making?

INVESTMENT RETURNS VIA MARKETING

(79) How is price actually calculated for routine and batch production? How are estimates calculated?

(80) How is price actually calculated for one-off production?

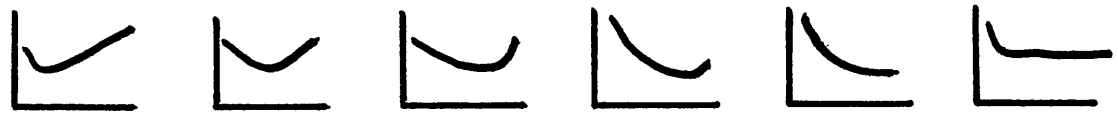
(81) Which factors merely influence price?

(82) What % profit margin is normally added?

(83) Is this % rigid or is it a variable?

(84) What minimum % profit margin would be acceptable?

(85) Assuming that C = f(Y) indicate the shape of your average cost curve for the main product



(86) Assuming that D = f(P) indicate the shape of your demand curve for the main product:-

(87) If on routine production price were raised by varying amounts, what would happen to demand?

(88) If on a one-off job price were raised by varying amounts, what would happen to demand?

INVESTMENT RETURNS VIA PRODUCTION LEVELS

(89) What degree of production run is possible? "A" "B" "C" "D"

(90) How are output levels fixed for routine production?

(91) Which factors determine and influence output levels?

(92) Is there a desired output level, and is it ever achieved?

(93) What is the average level of excess capacity? (1970-75)

(94) What % of total capacity is needed to produce your subsidiary products?

(95) If output were raised to full capacity what would happen to costs and price?

(96) If demand increased in the short run, what would happen to output?

(97) Do output levels tend to be constant as a policy?

(98)	To what extent can the firm change its output levels to move into and out of short run profitable markets?
(99)	What % of total output is accounted for by the customer who took the largest share?
(100)	By how much are your investment plans influenced by this dominant customer?
	Other relevant data.
	Follow-up visits.
	Consultancy - Feed-back.
	Documents, etc.
	Companies House, Annual Returns, London.

A. HANKINSON
Ph.D
1977

SUMMARY FOR LIBRARY PURPOSES
TO BE KEPT WITH MASTER COPY

ABSTRACT

THE INVESTMENT BEHAVIOUR OF THE SMALLER MANUFACTURING BUSINESS UNIT IN THE PLYMOUTH AREA 1970 TO 1975

(THE PLYMOUTH SURVEY)

This work has been primarily concerned with the testing of the hypothesis that the investment performance of small firms is impaired as a result of capital expenditure being motivated more by reaction to events than by conscious strategy. If small firms were intent upon optimum performance then they would presumably seek to achieve this by sound investment programming. But the results of researching 65 small firms in the wider Plymouth area between 1970 and 1975 indicated that firms chose to ignore, and even avoid, certain opportunities to optimise returns on net assets.

For example, survival or satisfactory profits only, emerged as fundamental goals. Investment strategies were negative or defensive even if apparent, and capital spending was determined in the majority of cases by the "necessity criterion". Firms clearly preferred to use their own funds for investment purposes and external finance was generally avoided despite profit potential. Companies were mainly indifferent to discounted cash flow and although returns on net assets were superior in the firms employing "oper-

ations research" methods, very few respondents were convinced of the benefits of certain management techniques, including D.C.F. Significantly, on an average basis, just over 60% of the sample firms actually failed to reach the target returns on investment which they had set themselves. Hardly any firms had employed consultants and were obviously prejudiced against them despite the absence of actual experience and the fact that rates of return on net assets of the pro-management consultant firms were impressive both in the Plymouth Survey and in the literature. Pricing was based upon rigid criteria, and any flexibility depended upon circumstances rather than policy. Yet flexible pricing did produce superior rates of return. Similarly, outputs were also rigidly determined and levels were rarely manipulated to achieve optimisation of overall performance. Despite an average level of 17% excess capacity, there was negligible market research, market seeking, or advertising, even though sales growth appeared to pay dividends. Finally, there was a significant correlation between returns on net assets and the adoption of a 12 point plan aimed at increasing profitablity. Unfortunately, the 12 point plan was by no means comprehensively employed by the sample firms.

In short, the evidence strongly suggested that the firms' overall investment behaviour was generally inconsistent with the goal of optimisation, and in this respect the hypothesis was principally substantiated.

Alan Hankinson
School of Management
Summer 1977